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INFOREX

# NEWS IN BRIEF

#### University successes A COMBINED computing

acience and electrical engineering course at Newcastle University has had early successes in industry. Five graduates have begun designing microcomputer systems within days of taking jobs with GEC, Marconi Avlonics ond Texes Instruments.

Each student on line course gets his own basic microcomputer, assembled in e frame which includes Motorola 6800 chip, memory, power supply and 16 circuit-board slots for the circuitry. Although only about a dozen students sign up for the three-year course each year, there is room for plenty more.

Modcomp planners

LONG-RANGE planning at CDI have started work at minicomputer manufacturer, salaries between £2,675 and Modcomp is to be the responsition. billty of John Lohb, the retiring chairman of telecommunications equipment manufacturer Northern Telecom. Lobb is same period lest year. already a director of Modcomp end on October 3 takes over as chairman of the executive comis a recent event. An increose of mittee of the Modcomp board. Kenneth Harple stevs as chairman of the Modcomp board and president of the company.

#### Retrial plea

FOLLOWING the successful bld by Greyhound Leasing for a retrial of its 1972 enti-trust complaint against IBM (CW, August 25), Celcomp has asked the same US Court of Appeal in Son Francisco for a retriel of its own anti-IBM case. This wea dismissed in the Los Angeles district court in February.

#### CAD engineers' pay dispute settled PAY negotietions ere under way between Duniop division in Birminghem in mid-1676.

Salaries of new

crept over 1%.

4% was recorded.

Into the computer industry are the first end second quarters this

entrants up 25%

nearly 9% was recorded between

year. The increase between the

final quarter of lust year and the

first quarter this year, barely

the growth between the first and

second quartera last year was

negative — a reduction of nearly

Computer engineers remnin

FINANCIAL planning and data-

hase services provided by the big

US bureau. United Computing

Systems of Kansas City, are now

As a further historical note,

and TASS, the white-coller saction of the AUEW, TASS has negotiated with Luces since then and

introduction of CAD equipment at its seroapace expansion of CAD in the company.

following demends for recognition of new skilla the dispute hes been settled by the company needed by design engineers using computer-elded design equipment.

offering to pay a jump sum of £200 back pay und an extra £4 e week following regrading of the men. design equipment.

This follows a six-week atrike by design

TASS says that it will use the settlement us no engineers at the Joseph Lucas company after the aid to further discussions with Lucas on the

industry. The lowest salary

gained by the 36 trainees leaving CDI was £2,900, while the

highest menaged £3,379. The

everage, et £3,074, ahowed a

growth of 13% over the year. The

quarterly growth rate between first and aecond quarters this

yeer wae just under 3%, a similar

growth being recorded for the

end Minidala, a small scale

system developed by UCS itself.

sight, a financial modelling

packnge. All these are niready available

to UCS customers in the US via

the bureau's own private

network, Uninel, which has

been linked into Tymnet espe-

cially for the UK service.

Users cnn also necess Furc-

previous gunrter.

UCS services offered in

**UK via Tymnet link** 

# Ray Fell for CW Ball

Populer television and radio comedian Rey Fell has been booked for the cebaret spot at the Computer Waskly Charity Batt on October 14 at London's Royet Lancester Hotel.

And Ray Fall's apot will be just part of the computer industry's big night out, with a four-course dinner and dending

support the development of a special terminal.

Ticketa coat £12. Sand your order to Tony Higgins, Computer Waskly, Dorast House, Stamford Street, London SE1 9LU.

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**Briefing** 

# **BCS** library

to the IEE

eau business in the UK, To to sell its operation long is major customers, the All search group, and const. THE Grilish Computer Society's solely on selling IBM const. When is being moved from products and the Spuri-

bolely on selling IBM comes library is being moved from conducts and the Syun London's City University to the mell business computer institution of Electrical Engineers. The BCS will pay the IEE smell business computer. to be Europe's leading : an annual service fee of about research company, aleaty. £4,000. BCS members will have free access to the IEE's two bureau subsidiaries inte 30,000-volume library and IEE don, Tempo Computer Sens which has an IBM 300-44 members will be able to use the AGB Computer Services: BCS' 4,000 books. The move from City Universvision, which runs a Hous-

3200 and a Digital Equip.

PDP-II.

BCS cut its library budget from £10,000 to £4,000, which was not Telex Computer Serve! a 360/50 (CW, October 18 Fr. enough to buy books and pay Tempo is to move lis made with the Telex machine Telex stoff will be kept on

#### \$2.7m damages

ity was brought on when the

DAMAGES of \$2.7 million have been awarded against IBM by a San Francisco court in favour of computer parts manufacturer Form Precision Inc. IBM is said to have tried to destroy Forro's business by selzing confidential pricing information end blueprints in June 1973. IBM chairman Frank Cary said that this Was related to a search of Forro's premises by the police with respect to IBM trade secrets. He added that IBM intended to appeal.

#### Merger talks off

MERGER talks between Honeywell and Silconix have been called off following disagreement between the three main Silconix shareholders. Honeywell has bid \$20.9 million (£12 million) for the Sante Clara, California-based semiconductor manufacturer (CW, September

### EMS to diversify

STAFF recruitment egency EMS Consultants is to diversify. We are particularly interested in acquiring companies involved is development of softwere Ackages, and in bureaux runnng on ICL or Honeywell fector John Wood told Compuin Weekly.

rocessor efter 800, seeme to be wiled by the fact that worldwide widers stand et over 2,000, end the company is still teking aders for the machine,

lodels of a computerised field stillery system has been placed Marconi Space and Defence for the Ministry of Dafence's moject BATES. Battlefield Ardery Target Engagement Syew and requires the development of two modals, one to add control position and the nd control position, and the

# **US** chief Joffe tells 'Why I like Insac ideas'

THE newly-appointed president of Inaac Inc, Seymour Joffe (CW, September 15), intends to lose no time in establishing the US base for the NEB's anothwere export subsidiary. Lest Mondey, a week after his official appointment, he left for New York to begin setting up the compony's office.

Joffe's background demonstrates on impressive range of marketing and manageriel auccessea. As a regional marketing manager for Univac, he was responsible for some of the company's biggest orders, Subsequently, he set up UCC's Datran communications subaldiary, and was a vice-president of Graphics Sciences, laier to become one of Burroughs' rere ecquisitions.

The insac post will be his first experience of working for a some of the most advanced dala organisations in the US and overnment-backed organiselon, and he feels it will be an interesting challenge.

He is filled with enthusiasm for the Insec concept. "It's geared towards helping compenies without seeking to control them. It's en original idea, and I

This policy, Joffe added, made Insac a radically different proposition from existing netionalised ventures, aome of which had acquired a bad reputation among the public. Equating the two approaches might have led to some public leck of enthusiasm for the Insac Idee, he admitted, but this was clearly a mistaken attilude.

Among established end prospective members of Insac, there is no lock of confidence, or of Turn to pege 3

Meanwhile, Brillsh Rail Is to place major urdera with Redifun Computers for seven mixed

key-to-disc and OCR systems to The Post Office National Giro handle data cepture at sites around the country. A pllot centre at Bootle, already one of the biggest OCR usera in system is already in operation at Europe, has placed an order Dorking, Surrey, capturing data 
Turn to page 25 worth £2.7 million with the from car ferry and international US-based menufacturer, Lundy rail tickets. Each Redifon aystem Farrington, for a radically new type of OCR system that will will include en Input 80 page reader aupplied by Recognition handle both capture end ledger-

ing of data on millions of Giro The installation of these cheques end transfer forms. In addition, the firm that systema is expected to result in supplied the existing Giro OCR considerable changes in the and document sorting equipsteffing end operational procedures in both organizations. ment, Recognition Equipment, The Lundy Ferrington ayatem hes been ewerded a £1 million contract to supply TRACE systems to aort the cheques and

for the Giro will go operational in 1979 and will replace Recognition Equipment document readers installed in 1987 (CW, transfer forms. TRACE, Tranaaction Control and Encoding, is March 3, 1667). It will be the first large-acale system of its kind to be installed anywhere in the world and will involve a hlerarchy of processors linked to OCR terminela celled Lundy Prime Mineter Barré trailing tha Operator Terminels, LOT. Left Alliance, but e majority nevertheless expected the go-

There will be I54 LOTe in the Giro system, eoch oble to handle in one pass functions that ere at present dealt with by several pieces of equipment. They will read muiti-fount alphanumeric information from Giro cheques that the company was working and input documents and per-towards its 1980 objectives to form an add listing function. If and input documents and perwhich holds 53% of the CII-HB ensure that whatever its future, handwritten date, such as a it would remain in a healthy money amount, is encountered

#### Another impartant new feat-ure, Chassieb, begins this week in Computer Weekly. Prolessor Doneld Michis, one af the world's leading experts on mechine intelligence, will Saymour Joffe is pictured jisft) with his two fellow insec top skacutives, John be conducting Chessieb which will examine the theory Pearca (centre), architect of the ineac idee, and now full-time managing director of ineac, and Tony Chandor, who has been appointed director of business behind computer cheac ea well as looking et perticuler gemes and exemples. The first Chessieb reports in detail on the World Computer Chess loumament held lest month in

The Liveware Saga Our regular Liveware cartoon

takes on a new dimensian this

#### conventional document readers. The documents will then go Indian holdings cut

DISCUSSIONS are under wey between ICL and the Indlen government which are expected to lead to ICL merging its Indian merketing and manufecturing companies, and reducing its holding in the merged company

and re-enter rejected characters.

According to Lundy-Farring-ton this will climinate the

reconciliation problems caused

by the batches of documents

with rejects accumulated by

Meanwhile, in a statement on Its position in India, IBM says that it understanda that it will only be allowed to do business in ployees.

India if it reduces its total holdings in its operations there

to 40% "We are still hopeful that the government will accept our proposais for 40% ownership in our bureau business and 100% in our manufacturing and marketing operations, and not force us to leave India." eave the company. iBM indie haa 800 em-

# Computing

Each of these solutions was tallormade to meet a specific

Each of these solutions was tailormed to meet a specific need. Piocessor power, loosi slorage, communications links and central facilities were all designed with care for oplimum usability at minimum cost.

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Greenlerd, Middlesex, URS SEH, Tel. DI 578 STILL.

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# **Baltimore bank** signs for Amdahl

LATEST bank to sign for en Amdahl 470 meinframe is the new IBM proceasor.

Maryland National Bank of Baltlmore, which wants one of the new smaller 470V/5 systems to run alongside lts existing 370/158. The benk wanted an IBM 3033, but switched to Amdahi when it learned how long it would have to weit for the blg

up to 25% higher than inst year.

according to a survey carried

trainees leaving the institute,

shows that the average salary

for entroni level programmers

made the biggest jump, over-

taking the computer engineers'

grade in the rate of salary

Treined programmers leaving

programmers who form the

sample is £2,768. This represents

a 25% rise in salary over the

As the survey is taken quar-

terly, it also shows that the jump

The aurvey, taken among

out by Control Data Institute.

available to time sharing users in the UK via the Post Office's Irensatiantic link to Tymnet, the US common carrier (CW, Januery 13). UCS runs a complex of alx big

CDC mainframes at Kansas Clty ond its UK subsidiery, London United Computing Systems, LUCS, formerly known as London University Computing Services which it acquired early this year (CW, January 20) runa aome big batch engineering packages from UCS locelly on

The time sharing services now evallable via Tymnet will

complement these and will provide 10 clips and 30 chps access

#### Office node in London and a to e range of database systems processing charge for the use of the UCS systems in Kansas City. RAF tests completed

ACCEPTANCE teats on the ICL 1900 machines there - o 32K 2680 at the RAF pay ond records centre at Innaworth, near Oloucester, have been completed by the Central Computer Agency. The 2670 it is replacing et nnaworth is being transferred ater this month to The Southern

central computer system to service all authorities in Eng-Weter Authority computer entre et Brighton. the North West, Yorkshirc end Severn Trent all have ICL 1900s.

# Growth of PO monopoly

• From front pege where users switch from a good line to e poor ona end find thet the equalisation on the modem hes not adapted to the changed line quelity.

The question of possible union action ia brought into sharp focue by e diepute in the City of . London where some members of the Post Office Engineering Union are refusing to connect privately-acquired modema to eased linea

A Post Office spokesman aeld thet discussions to end the dispute were continuing with the engineers and they apologised for inconvenience caused, A spokesmen for the union told Computer Weekly that the action by members of the Lon-

someone down to find oul."

mented consultant lenn Berron.

and edopted at the unlon's ennual meeting. But we are not

Unofficiel or not, the diapute force users to inalall lnappropriete equipment.

"Unless the Post Office monopoly of attachments and use of Information is broken, the Corporation will, for the best commercial reasons, nevertheless become a Big Brother," com-

"What happens when the Post" Office introduces a terminal for use on the telephone network with the Vlawdata service? That

UCS snys that agreements facturer of acwing thread, has with other European PTTs havupgraded its computing fuciing similor contracts with itles by innving from n DEC Tynnet os the UK Post Office, PDP-8A (CW, August 25) to o model 300 from Prime Comcould be negotiated fairly soon ond that this could be the prelude to ecquiring bureen Greenberg's mnnuglng direcsubaldieries on the Continent.

ond inflexible.

tor, Geoffrey Greenberg, sald lils Charges Io UK users of the company had considered a blgtime sharing aervice will include ger DEC machine but found the £6 nn hour for use of the Tymnet company's rnnge of disc drives transationtic link vin the Post was not suitable for a gradual growth. There was n blg gap

'DEC has grown too his WORLD leader in the miniconbetween the small capacity puter market, Digital Equipand the large discs.

ment, has lost a UK customer In addition, Greenbergh hecause, says the customer, the at DEC packages but them too inflexible for the company has become too big pany's use. And, said Greet's The customer, H. Greenberg, a the PDP-II RSTS open Manchester-bused munusystem was too much !oriented, and the coup wanted to keep with Fortic

The Prime 300, due E: instelled in November, wills up to 32 terminals. Greekertaking advantage of the fa power to start a computering service and a bureau sm offering order preces costing and quality coning. terns lo its customers in ites

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# French threat to CII-HB

THE French Socialist Party has showed the ruling silience of announced that it intende to netionalise the country's only mainframe manufacturer, Cil-Honeywell Bull, if the "Left Allience" wins the General Election next Merch. Its mein partner in the Alliance, the Communist Perty, has only proposed nationalisation of

# 1033 production

PECULATION from Australia and the US that IBM intends to the production of the 3033

#### Scicon contract CONTRACT to provide

her for the woole and control system. for the whole command

vernment to retain power.
CII-HB hed no comment on

the statement from the Sociel-

ists, but company president

Jean-Pierre Brule said redently

capture equipment in the world

is being installed by two major

Office and British Rail.

Modcomp plans
In mid-1878 Modular Computer
Systems ran into serious financial
trouble caused mainty by its rapid
growth. Now the company is
profitable again and its moves to
stay that way have included the
appointment of a general manager,
John Pitt, to supervise all sepects
of its European operations. He tells China is opening up the Bamboo Curtain to technology and present-ing a vest potential market to world manufecturers. Nick Bark, of interdats, who was a guest of the Chinese government sadier this year, comments on the prospects for computers.

COMPUTER WEEKLY'S INSIDE NEWS

### Fair questions

nie des Machines Bull.

The most recent opinion poil state.

How will new technologies affect and users? Will the DP manager's end users? Will the DP manager's role charge as computing converges with commonications? How should the government help and users? These will be some of the questions discussed at Detafait. Gat a foretaste in our provider.

China chances

Keith Jones of some of his plans for

Secure services of a public little in the news and the company.

Secure services of a public little country lobe to end when the country lobe to end of a public little countr

ALSO ..... Computarview on unemployment focus on cleaning Policy on unions Downtime chass special Secrets of Master Spy Gilb's Mythodology Software File Puzzier Letters to the Editor Op Spot Microprocessor News

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Paper Tape Tel. No, DE action by members of the London City branch, was unofficial terminal business, and under present rules would lock outwith demands for a 38-hour most of today's computer terweek proposed by the branch. hinal suppliers

lond end Weles. The other three,

1902A and a 112K 1902T.

Southern Water la one of four

weter authorities that have

decided not to aupport a Na-

tionel Water Council plan for o

certein, and we have sent highlights the way in which an extension of the Post Office monopoly could open the door to similar union actions which

AGB buys Telex AFTER three years in the

four-course dinner and dencing until 2 am.

The eim is to aqual the £1,000 relead by lest year's beit. Like lest year, the proceeds will go to the Critish Computer Sociaty's specialist group for the disabled to support the development of a

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# Cstand 386 DEP Oct 11-Oct 20

# COMPUTÉR WEEKLY

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ISSN 0010-4787 The state of the s

# CONRUGERYIEW

# Unemployment death by a thousand cuts

vels and will continue to do so at an increasing rate. The only real question now is how advanced Industrial societies will cope with the effects of the ability to produce more wealth using less

That might seem like an alarmist statement, unjustified by any concrete evidence. And to some extent it is just that.

It is meant to be alarmist because, ilke any alarm systems, it is meant to help stimulate action that will help stave off some impending unwelcome act.

It is not backed by any comprehensive research study into the effects of information technology developments on employment levels, because Computer Weekly knows of no such comprehensive survey.

But we are awsre, day in and day out, of computer systems thot are being implemented which either eliminate existing jobs or reduce the number of jobs in the future,

However, few companies like to announce, "Our computer has saved us x staff" because there is a fear of what the union reaction

It is a case of a creeping death of a thousand small cuts,

In the Observer recently, the distinguished financial columnist C. Gordon Tether examined the problems of the impact of new technologies on employment levels in an article headed "Ideas that put the world out of

Tether questions the remark made in a speech by Lord Houghton, former chairman of Computer Complex Cleaning the Parliamentary Labour Party, Committee (CW, September 15) suggesting that the answer to is running a cleaning workshop

THERE was once a highly

skilled and competent systems

programmer. He had a very

small computer (a 12-bit minl),

but very ingenious ideas. It

wasn't long before his small

computer was doing time shnr-

ing, graphics and a host of

send them a string of user

plete with timing and branching

facilities, variabla input modes,

He told his wife he would be

home early and set his systems

suming jobs he had left hanging`

going to do a host of time-con-

about for weeks.

advanced functions.

in "bootting industry and technology by all possible means".

Pointing out that most that the steep rise in unemploy ment in the 1970s is due to "structural changes" beyond the transitory effects of waxing and waning business cycles, Tether

"There is increasing awareness that, foremost among the factors that have led to this structural diaequilibrium is the pace of technological advance more particularly the evolution of machinery capable of producing the same output as that which it replaces with many fawer workera."

This was one of the crucial points raised at the Hedsor Park conference earlier this year, on the theme Can Computers Save Britain? (CW, July 14).

ONE of the most neglected areas

in computing is site cleaning

Being logged in the non-

glamorous activity league, cleaning seldom receives the due

care and attention of computer

Establishing good cleaning relations is difficult. Few mem-

bers of DP menngement are

around when the work is done

So the news that an organisa-

clatter he locked the mnchine

room door, heaved a sigh of the

contentment born of true nuto-

In the morning the arch

around tha teletype was not the

enticing mound of paper he had expected. He glanced ot the machine lights: their playful

flicker assured him that there

was no obvious hardware fai-

lure. He approached the now

The end of the paper roll, still

hanging by a thread to the

platen, was a chewed-up mess

and, as his eye took in the pink

edge of the paper, he realised

with a sinking feeling that he

Moral: He that lends his com-

puter wings, must still attend to

print his night's work.

mation, and went home.

silent teletype.

defined commands - all com- had left the teletype with an

about for weeks.

To the sound of the teletype's

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ainca 1970 in the UK and ebroad

tion known as The National

(or perhaps not done).

communications and semiconductor technologies will have profound effects on the nature and levels of employment.

The counter argument to fears of a threat to employment levels from technology is to suggest that increased efficiency will create an expanding economy and therefore more jobs.

But, es Tether writes, "Whot the experiance of recent years appears to demonatrate is that It has become highly questionable whether, even where a fast rate of economic advancement can be maintained, new jobs can be created fast enough to make good the destruction of existing ones that the increasingly rapid tempo of technological progress Is bringing about everywhere."

analysed in a straight "we must genius.

next month, could well be the

dramatic breakthrough the

Although this particular semi-nar is designed spacifically for

those managers who have on

overall responsibility for clenn-

ng and those who actually do

the job, it is open to all with an

interest in Installation cleaning.

Clearly the opportunity of meeting those responsible for cleaning activities should not be

DP professionals could take

the opportunity of mentioning the inadvisability of scrubbing down the disc drives with soapy detergent. Rubbing down the CPU with abrasive cleaners

similarly is unhelpful. Using

disc-packs as door-stops while

the suction cleaner is in opera-

tion also needs discouraging.
The facts of DP cleaning life

are often staggering. Contruct cleaners, possibly hired by the

hour, make a determinad asauuit

on the installation floor. As a

result, not only does the compu-

ter room trolley become unman-

ageable, but the operations

manager staggers on the high-ly-polished floor; or the claaning

team regards the equipment as a lethal adjunct to a reptile house.

renting.

ndustry has been awaiting.

If that pre-emptive action does not happen, there could be a traumatic and destructive period while society learns to Unemployment is an emotiolive with - or reject - the fruits of man's scientific and technical nal political issue and is usually

the hendlines.

counting machine, the II 3 teleprinter-style servini, a TCV 250 CRT unit, and set

The death by a thousand

technological cuts passes un-

noticed nn a day-to-day basis,

whereas an Immediate thrent to

Urgent and courageous politi-

cal action, however, is needed in

preparing for the impact of new

technologies. Action that tries

tn ward off any potential anti-computer Luddite move-

ment by planning for a future

where high unemployment may

be an acceptable - even

desirable - objective, opening

up prospects of increosed leisure

British Leyland's workforce hits

# Ten years COMPUTER WEEKIT

noieble firsts at the Aronson Chase Congress et Harrow last weekend, billed se Europe's lergest. The open entry of 154 players included the first appearance of a computer contestent in any European congress of this typs. In addition, in en informal SEPTEMBER 21, 181 two-game metch of five-minute chess et the and of the proceedings. Britain's Micheel Staen became the first international Orandmaster to drop a game to a machine in biltz chess.

The first prize for the Dpen

SEPTEMBER 21. [18]
The Minister of Teares.
Anthony Wedgwood services and the wind was and the wind was and the wind was and the continuing sense of almost problems and the continuing sense of almost computer plan. Cli was a license to build put up e similer ne set... The deeth of his Electric's System 4/10 kill with no bests for a tensity larger systems... Gire. terminal market with \$12 100 based on the Auto

40 serial printer.

under the worn compute Maybe DPMs should :-

# on being taken to the disanus

the seminar. Being lake. cleaners could well be are.

# an essential role of OP a:

ing installation resources involved could exceed £1m in value the Indifference to cleaning standards is surprising. The DP operation chuld be at the mercy of a teom of heavy-hunded cleaning operatives. Esta-

blishing firm installation clean- ing experience.

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Two firsts for Chess 4.6

The sole defeat occurred in the first round et the hends of Len Perry, a player reted considerably waekar then Chaes 4,6 which enjoye "expert" stetus. The upaet was instructive. On move 13 the program taunched en ingenious four-move combination which anetched a pawn, but paid the price of having its mareuding knight permanently immobilised in a fer corner. The program does not have the concept "tamporerise but the program in its

repartoire.
A contributing factor in Chass wee shared by the Czech Grendmaster Hort and the young British 4.8's success was the psycholomater retail the player Peter Large, each with 8 ½ points. The computer program Chess 4.6 lost one game, won gicel effect, even on strong players, of fecing a mechine for

the first time. Chase 4.8's third-round opponent T. Lewin, who once played first board for Dxford, was startled by the program's hebit of calculating during its opponent's thinking time so as to concect a raply to ready for instent release. "It's very unnerving," he

Chees 4.8 is the reigning world chempion in computer-egeinst-computer chees. It was developed by Lerry Atkin and Devid Siete et Northwestern ty sefe but trepped" in its University, US.

quarterly journal, User News, spindles per cabinet and Teknos

DONALD MICHIE Chaceleb: pega 4.

ouotes £59,000 for a complete

DSS 64 system with a controller

and two spindles holding a total

of 480 Megabytes.

# Fresh attack on ICL's levy policy Computer Users' Association

due out at the end of October,

users will be asked to submit

The matter is discussed in an

nrticle on the subject by the

chairman of the Standing Com-mittee on Policy and Pricing, lan Gregory of Smiths Industries.

many users feel they are

adversely affected by the policy

and in what ways, and what the

implications are for the future.

given to ICL for its comments

and could result in the user

conference on the subject,

originally planned for this

in the New Year.

month (CW, July 21), being held

The DSS 82 and DSS 84 plug

compatible disc subsystems

from Teknos use Calcomp drives

which are normally used as IBM

3330 compatible units with 100 or 200 Megabytes per spindle. The Teknos systems reformat

each spindle to look like two or four EDS 80s, with overnil capacities of 120 or 240 Mega by-

They are linked to an ICL 1900

The results will probably be

The aim is to find out how

their views on the levy policy.

THE ICL levy and marketing policles have come under further strack. Complaints have been sent to the Office of Fair Trading by the Central Computer Agency, the office through which all Government computer equipment is ordered, and by plug-compatible systems house, Teknos Systems of Uckfield,

Teknos has introduced two disc subsystems which are aimed at ICL 1900 usera put off by the cost and performance of the EDS 200 (CW, September 8). The systems, DSS 82 and DSS 84. are said to provide two and four logical EDS 60 drives per spindle respectively, at 50% less than the ICL equivalent.

The Teknos complaint to the OFT is about ICL's compensatory levy which is demanded from users installing add-on memory or peripherals from an independent supplier — or OEM attachments as ICL calls them. The levy is narmally 20% of the monthly rental ICL would have received if the user had chosen

The CCA has complained to the OFf about the levy policy, mainly because it can affect ICL government users as well as

Several users have challenged iCL's levy policy, including Bradford Metropolitan Council and Norwich Unian (CW, June 2), but the CCA and Teknos are the first to take the matter to the

in the first full Issue of the ICL written.

vie a controller based on the Digico Micro 18E minicomputer and are fully supported by standard ICL EDS 60 executive and operational software. Teknos says that the DSS 62 and DSS 64 provide reductions of 33% In latency and 14% in

OFT. However, the office is average seek time over the EDS already dealing with complaints about servicing policy (CW, can be slower, depending on the number of logical records to be

# PU asked to take over all private maintenance

A SETTLEMENT Involving the Post Office taking over main-POEU, the London Branch and members of the London City believe the auppliers Engineering Union

Branch members are refusing to connect privately-acquired equipment to Post Office lines (CW, September 15). The immediate imm

tenance of privately-acquired the Post Office will be held on dala equipment such as modema October 14 to try to resolve the and teleprinters is being sought in the dispute initiated by told Computer Weakly. "We hellow the suppliers would gineering Union.

Pranch Description probably welcome the Post Office taking over main-

impasse is being resolved taka over maintenance, adding by the Post Offica buying the company was in equipment involved and taking business to sell equipment and over maintenance, but the union is seeking a permanent change in the rules.

Seeking a permanent change ance. No one at Racal-Milgo was a seeking a permanent change. available for commant.

#### Why I like Insac ideas' From front page

leas. In his prolonged telka

with these companies, they had put forward "some very good ideas, which will prove highly saleable in the US" "Contrary to another popular opinion," ha added, "UK people are prepared to work hard, and programmers really know

how to write good software" Joffe does not, however, see large volume of salas as Insac's only benefit, "Our first task is to establish credibility. Once we have shown ourselves to be o credible organisation with good backing, people will talk to us freely, and this could result in more front line technology being brought into the UK.



TELETYPE-compatible Vital VDUs from ATS Communications of Heywards Heath ere being installed in place of teleprinters throughout the BBC's internet communications network and a SBC sub-editor is pictured here dictating a news bulletin to a telegraph operator. More then 100 of the VDUs, worth £280,000 in total, are to be installed. The displays with be used for assambly of news builstins, Press ennouncements end programme schedules for the regions. The BSC's massage switching systems include en ITT 6400 ADX system for the oversees service, end a system from Unit Automation of Tentarden, Kent, based on a Digital Equipment PDP-S/L mini (CW, Dctober 26, 1876).

# Micro-controlled tape recorder launched

AN Integral microprocessor enables the Model 101 portable user to varify calibrations and to instrumentation tape recorder program specific sections of the announced by Honeywell to be callbrated without expensive be programmed. external test equipment. Honeywell says that the

tape for replay. It also allows the sequence of tape tracks used to

Supplied by the Honeywell

recognition

represented by a particular trade union will be racognised by GEC, said Lord Nelson, chairman of the company, at the annual meeting of GEC.

He was replying to a question from John Sampson, general secretary of the United King-Engineers.
This follows limited recruit-

ment of professional engineers at GEC, following management atatements that UKAPE cannot and will not be recognised. "Thia mlaunderstanding has

now been cleared up by the very declaration of policy by Lord Nalson," aald Samps

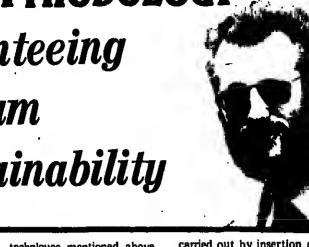
Test Instruments Division, the microprocessor also enables the Model 101 is a lorge reel unit providing from seven to 32 recording tracka. Honeywell says it is the first

portable instrumentation tape recorder controlled by a micro.



Prime Computer (UK) Limited. The Meriph Centre. St. Peter's Street. Bedlord MK402PN and The Conch House. 173 Sheen Line. London SW1. ISNA. Telephone Bedlord 9234 65121, or London 91, 978, 1918.

Guaranteeing program maintainability



DO you know how to write systems specification, or a contract guarantee which will help you be aure that the resulting programs are really easy to modify and understand once they have gone into the operational phase?

Some people fooi themselves that they know how. They write specifications like "Standard Cobol," "Structured Progremming" and "Small Modulea." Probably these things do contribute to e certain degree to cese of program maintenance. But they do not guarantea any known level of maintainabili-

The system can be delivered to the software house or your own people, it can formally meet your specifications, and it can be much more difficult for your maintenance programmers to find their way around in than you had hoped

What we need is a way of motivating the program producer, and the program designer, to create a specific level of ease of understanding the program. From our point of view, it should not really matter how this is achieved the important thing is that it is

There are many different techniques for increasing the maintainability of a program, and a lot of them are much more effective than the three

We should not therefore limit our suppliers by constraining them to a specific set o techniques, because we then become the ones responsible for lack of sufficient main-

Let's learn to judge by results, not by techniques. The practical technique

which we use to measura a degree of maintainability la called the "bebugging" technique. Various other terms are used such as artificial bug insertion, which is close to the concept of artificial insemina-

This technique has been used extensively by researchera such as Gould and Drongowski of IBM, to study debugging behaviour. It mea-sures the effect of various people and various program documentation levels on the

work of identifying bugs. Learning from these experiments I have for the past two years made use of the following system and contract spe-clification in a variety of applications:

The program maintainability shall ba at least 90 per cent probablity (in 1/2 hour) for the signed and trained maintenance programmer to identify (without fixing and retesting undesirable program results ("bugs"). A practical test for system acceptance may be

carried out by insertion of at least ten artificial program bugs at random by an Independent party, one at a time. The qualified maintenance programmers must demonatrate that they can correctly dentify the atatementa caus ing the bug in at least nine out under one half-hour

are feeling that day).

We got agreement immedia tely from the aupplier to an acceptance test based on the above formulation. At first he was sceptical, until. 1 pointed out that such a formulation actually limited his responsibillty to the bank, His other objection was, "How can I know if my programmers are making high enough quality programs until it is all finished?" To which the reply was; perform the test on the first module (of 200 planned). If you pass it, you are on the right track; if not, you have an

# ("each," or "on average," depending on how lenient you In one case, a Scandinavian

bank online system, the contracta were aiready written, and the only specification for the supplier of the 180 intelligent cashier machines, and their programs to be supplied, was that the bank's people should be able to maintain the programs."

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you capture one or more rowe of

your opponent's pieces by trapping them between your own pieces. The

captured places are turned over to

show your colour. The process

ewitchee back and forth throughout ne, end part of the appeal is

right up to the last move of the game.

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otential for drematic revareals

programming methods and documentation methods.

and varying material supply.

The user could, from his own

including engineers Hick Har-greaves and Son, of Boiton, Lancs. The product was devc-loped antirely by Comshare's UK division, initially for the UK

### **Trend** predictor package

ADDING to the variety of oftware tools on the market for predicting trends in any kind of data on the basis of past values is the SIA bureau. Known imply as Time Series Data Base. the software allows aerias of past data values to be stored.

Data can be entered into the TSDB database on punched

# SOFTWARE FILE

# Multi-threading extends Cortez

had been introduced partly in the competitive ICL transaction rocessing market has been eleased. The enhancements to Zeus-Hermes' Cortez TP monitor demonstrate the continual increase of TP sophistication among small-scale ICL users.

The major enhancement to Cortez is the introduction of multi-threading, the capebility of processing more than one transaction simultaneously. In many Installations, this is likely to Improve performance considerably, sinca relatively fast transactions will not be held up by slower work.

The ICL 2903 series TP monitors, ETS and MTS, do not employ multi-threading, adopting an entirely different philosophy for running user program modules in a TP environment. The main independent competitor for Cortez, the Telecomputing TPS, already has a multithreading capability.

ICL 7502 and other head two on smoll-scale 1900s. Another prospective 1900 Corterminals have been provide tez user may, in the near future, "devica Independen progress to isrge-scale 2900s, through ICL's DME operating handling facility will ( hard-copy printer at attached, using the same system. This could lead Cortez into the 2900 market. face as the visual disting While multi-threading will, in many cases, Improve response Although Cortez min

Zens-Hermes has attempted to reduce this drawback, notably by excluding multi-threading file access, which, It predicts, will seldom be required. This new version, Cortez Plus, is claimed to occupy only 500 words more than standard

time. It clearly carries with it a

penalty in memory occupancy.

response to competition and

because of requests from users.

The majority of Cortez users are still on the 2903, but the

company has five 2904 users and

Other enhancements Incor-

# Comshare, Univac in attack on inefficient materials management

Importance of efficient materials management to the manufacturing industry has come on two

Univac's formation of a spe cial UK division for its Unis manufacturing control system has bean swiftly followed by the release of a new materials management package, Boss from the Comshare bureau.

Boss, Comshare claimed would allow a company which manufactures by assembly or fabrication to calculate its materials requirement ond regulate its stock of raw materials or components in the face of varying demand for its product

terminal, update stock and order information, inquire into stock status, produce standard and spacialised reporte, and nliocote stock against known orders, sald Comshare. Various production plans could also be tosted, to judge their effect on stock levels and their efficiency in meeting

Boss aireody has five users,

etrieved and amended.

SIA already markats a prediction aulte known as Sybil/Run-ner (CW, October 21, 1976), ond TSDB has been fully interfaced with this software.

cards or paper tape, or direct through a terminal. In eddition to the time series values, accompanying documentation also be stored. TSDB was or in ity developed by White Communication in the companying documentation.

market, but when a user base has been established marketing will extend into the US and

Together with the softwure, Comshare is uiso to provide u consultancy service to aid Boss

Univne UK's new division is it runs on Univac's Series headed by Mike Sanders (Peo- 1100 systems.

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who will use unique software ATLAS to :

staff dedicated to Unis. database for all informatic: handles inventory manage production planning and duling and order many:

saction attempts to upices

same file. Individual non

sets of records or an amor

may be "locked" against to Promised interfaces to

ally an Australian protect

enhancements Impunio

Cortez Plus bave been preix

entirely in the UK. Zeu

could thus find helf a

advantageous position of all

the enhancements bet a:

originator, Spectrum School

of Melbourne. Definite &.

sions on this front have M

begun, said a Zewie

THIS diagram represents six counters stacked on three bases
A. B and C. So the position

Each POSTAL REBATE MAILING eft-to-right can be described as

The problem ia to bring about

The product elso provide

sutomatic back-up copies of detests, which ere changed whenever the datests are

The product is not evalishing

yet — release is acheduled for early next year — but reaction of

potential US users who have examined the appealfications appears broadly favourable. Users of the 3850 have previously had to provide data

transfer and back-up manually, and the new softwers fulfile a widely felt need, it was ack-nowledged. Hierarchical Storage Mana-

ger le designed to run under MVS and JES3, on all 870a

from the 145 upwards. The software is evallable for the 3033, ISM confirmed. It is designed to service both batch and online users.

Puzzler

3

left-to-right position in only 15

Each "move" must consist of transferring one uppermost counter to another base - but at no time may any number rest on a lower number than itaeif.

For example, tha first of the 15 moves could be either 2-to-A, 1-to-A or 1-to-B; but 3-to-B, 3-to-C and 2-to-C are not permitted. See page 55 for solution.

# The Agfa-Gevaert COM-patible package.

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### ANSI specification boost for Mumps Integrating mass with disc storage SOFTWARE has been ennounced by IAM in the US to integral of the 3880 mass storage system its 3880 mass storage with disc-based storage. Known se Hisrarchicel Storage Manager, it automatically moves detests to diecs or cheaper, slower 3850 storage, dependent on frequency of

was received last wesk, with tha announcement that specifica-tions for an ANSI standard for the language have been accept-ed by ANSI's DP committes, X3

The Mumpa ANSI atandard was first contemplated almost exactly a year ago (CW, September 23, 1976). Final approval gives this reletively new, user-developed language a sta-tus so far achieved only by the "industry standard" languages such as Cobol, Fortran and

Mumps is designed for com-plex data handling in en interactive mode, and incorporates its own data management software and multi-user execu-

It was originally devised by Massachusatts General Hospital for medical information retrieval and this has remained its predominent use in the US.

language has gained a number of commercial users in varying been some fears expressed that fields, prominent installations standardisation will mean a being et ATV end Pye Rscords. slowing of further development Its popularity was undoub-tedly due mainly to its adoption in the language.

Digital Equipment, for use on PDP-11 series. This hardware, for which Massachusetts Hospital originally designed Mumps, still accounts for the overwhelming majority of Mumps installations. The move towards standard

sation was encouraged by the beginning of Mumps implementation on other machinea. Acceptance of such e standard by Internationally recognis body will doubtless further accelerate the spread of reliable lementations on to a variety of hardware.

The announcement coincided with the second European Mumps user group meeting (CW September I). A number of non-DEC Implementations of Mumps, perticularly on microprocessors, were presented to

the meeting. At a meeting earlier this month, in the US, a timely announcement of a planned implementation came from Prime. A spokesman for the company said that Mumps was not a standard product on Prime's minicomputers yet, but the company "will almost certoinly offer Mumpa" In the near future, probably by the end

ANSI standardisation and the prospect of use of Mumps on a wider range of equipment has been, in general, well received

# **Package Programs** steps into **exports**

WITH a successful record of bringing overseas software products to the UK, Package Programs of London, Is likely to begin exporting some products of its own. The first step into the oversess market has eiraady been taken, following the founding of an associate company in Paria.

Initially, this company will handle Package Programs' existing range of producta: the MMS. accounting packages, from US company Software Interpayroll system, from Q-Packag-ed Programs of South Africa.

Package Programs la, howe ver, already recruiting for a research and development department. Thie move is likely to result in the production of packages in the UK for home sale and export, director Abram Azagury confirmed.

No detalls could be givan o applications to be approached ting-related area in which

Package Programs has alrasdy established its reputation, will be high on the list.

The new compony, PPL (France) SA; is to begin trading on October 1. The decialon to go into France was the result of a market survey, which uncovered soveral good Franch prosections. ed several good French, pros-peots, sald Mr. Azagury. Vent-uras into other EEC countries are under consideration.

# Simulating queueing

simulation of queueing systems without having to learn a specialist ianguage has been adopted by the London University Computing Services bureau. Originally developed at Imperial College, London, under the name Draft, it has been re-named LUCSIM in the LUCS

LUCSIM accepts a logical and numerical description of the ed, and generates from this a

Constraints on the input mean that this program will be simple in structure, but it is intended merely as a draft, to be elaborated by a Fortran pro-grammer. The effort involved, UCS claimed, was still a fraction of that entailed by writing a program from scratch.

### The benefits of doing some maintenance

to a period at the maintanance

Far from being a punish-ment, our contributor suggested, maintanance work could vide valuable training, increase programmer's awareness of the bad practices which create later maintenance problems, and thus make him or her a better development programmer.

handed ovar to the leas He suggested that not only could programmers spend part of their initial training period competent programmers. Why was this, he wondered? Was there still an inadequate supervised maintenance appreciation of the importance work, but that trained progand complexity of mainten-ance — or, to look at it negarammers could benefit from having their jobs "rotated" lively, of the wrecking potenbetween development and ial of bad maintenance? maintenance programming.

How is development an Alternetively, is there an element of reward and punishmaintenance work partitioned ment in the apportioning o at your Installation? is there an work - the good programmers established team of "maintenget to do the interesting development jobs, while the ance programmers"? Does everyone maintain his or her

DESPITE some doubts ex-

pressed by an IBM survey

Programmer Notes, July 21

it is still generally accepted

that most programs are

long-lived, and maintenance

consumea a large proportion of

the total programming effort, perhaps mora than develop-

In spite of the importance of

the maintenanca function, said

one prominent aoftware deve-

oper, maintenance was usu-

ally a boring occupation, and,

many installations, was

nent in some cases.

risk of unclear code written for one programmer's eyes only? Or are job functions freely rotated? Whetever technique ls employed, do you think it is the beat, or could it be improved?

Is there any way of reducing the meintenence load or, alternatively, of making main tenance work more interesting? Our correspondent, e marketer of packages, naturslly suggests that the maintenance load can frequently be eliminated by buying a packa-ge. It would be interesting to see whether this is true in practice.

Does the "not invented here" syndrome allow DP managers to leave their packages alone, or ore unfortunate programmers called on to maintain, or drastically amend, software acquired from outsi-

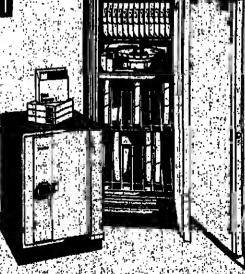
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#### **COMPUTERS IN THE OFFICE/** INTERNATIONAL BUSINESS SHOW October 6

This year, the Gueiness Elictoray Exhibition blossoms in bright new colours as the International Gueiness Show, to be hald in Simingham from October 11 to 20.

By bringing small business man and the allice manager lace to lace with new computer systems, the IBS could prove to be an important andmark on the way to the much haralded "automated office."

In the October 8 Issue of Computer Weekly, there will be a compitalizative praview on what is to be on show at the ISS plus specially commissioned articles looking at the needs of the automated office and of the computer environment in general.

#### \*INTERNATIONAL EDITION -SYSTEMS 77 PREVIEW + Bonus Circulation October 13

The biggest West German showcass devoted exclusively to computer systems and peripherals, Systems 77 takes place in Munich from October 17-21

Once again. Computer Weekly is taking a stand at the shew to offer advertisors an unrivalled means of maching the large number of high-calibre visitors to the show. Ouring the course of the exhibition, 5.000 copies of the October 13 Computer Weekly edition including a comprehensive preview of the exhibits on offer, and a sortee of attibles on computing in West Garmany, will be distributed to visitors

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> NORTH AND SCOTLANC Herry Aiken 061-672 4211

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# LETTERS

# The guardians of the public interest...

COULD i express my completa support for your Computerview on Professor Dijkatra's outburst

However, I feel strongly that it is not simply a case of accepting microprocessora because they are here. Surely

#### Indebted

YOU reported tha sad tele of tha destruction of our computar installation (CW, September 8). Through your paper I would like to thank the staff of the Wellcome Foundation Dartford and BOC Datasolve who halped us recover our planning systems and get them oparating again nimal interruption.

P. S. BEDINGFIELD Planning Systems Project Bowater Scott Corp.

until such time aa the ordinary man in the street can take over the "technology" as a well understood and accepted part of

contribute more positively to public understanding than any othar factor since the invention of the computer and must therefore be given an unequivocal welcome.

Whatever has happened so far in the history of computing, very little has been done to dispel the fear and misunderstanding of the general public and non-computer people pro-duced by the large centralised mainframe, and Ita eccompany-

The microprocessor and the pocket calculator are, thank

goodness, helping to correct

lgnore thia long-term objective, ia simply to establish an elite feared and necessary to survival in the technological jungle, a group of dedicated "witch doctors" full of modarn mumbo-jumbo. Professionalism then begins its exploitation of the public, gradually disregarding conscience and standards to legenerate into the cult of the secure job end the good salary,

youngeat profesalon, take a different stand even if most of us are no longer needed in the

Dr P. J. MARCER South West Univarsities

# Shortage of staff due to lack of training

i WOULD like to comment on the letter from Mr K. Carter (CW, July 28) about the acute chortage of computer paople, resulting in the high turnover of staff. The most valid reason for this shortage is lack of training, and while I agree completely with the pointe Mr Carter so firmly made, in must be said that 100 per cent responsibility for the current shuation cannot feirly be pieced on the choulders of the educational institutions alone. A company must have an education and training programme to essist its amployese career development. Obviously to be cost affective this training programme must be co-ordinated to make it responsive both to company requirements se well as individual needs. People with a high need for advancement will leave a company unless this need is fuifilied. Empheels on edvancement, through training, increases the

els on edvancement

through training, increases the job satisfaction of computer

The problem is two-stage: Education to industry entry; and education end training for career and technical edvance-

It at both stages must be shered by the educational institutions and the industry as a whole. A

I agree with Mr Carte in

d training in company

# Plenty of literature on CAL systems

IT was interesting to read the comments of NDPCAL's assistant director, Roger Miles, on the availability of published material on computer assisted learning (CAL) systems in the US (CW, August 18). As many of your readers will be aware, there now exists a large number of atudent orlentated computerbosed teaching and learning systems in both America and Europe. Of those available within the US, perhaps the most well shared interactive Computer Controlled Informotion Television from the Mitre Corporation) and, of course, PLATO

I should like to clarify a comment which originated from Mr Miles describing the apparant scentings of informations. about non-British CAL effort. The amount of literature available on and relevant to US CAI/CAL systems is quite substantial. For example, there are reports/papers on the PLATO system alone. The first of these dates back to about April, 1961, while the most recent is prohably that entitled, "Demonstra-tion of the PLATO IV Computer Based Education System — Final Report for the Period 1/1/72 through 30/6/76." This latest report (375 pages) was published Middlesbrough

cations are described; the lead elementary mathematics to versity physics and university effectiveness of PLATO and its There are many additions

systems located in either the li that there exists a wealth. Information about CAL, he orthodox and somewhat insch NDPCAL organisation. Ar attempt to broaden the terms opportunity of learning me

# Care of equipment

Mr Richard Evans says in his that some computer use orticle (CW, August 25) and believed, or worse, just water would like to support his to believe, that this mainte own. My commenta are formed from o hardware engineering background, and i alm them the list of daily choice. directly at the computer manumay well be other factors when facturer independent service have helped to bring about companies, and users. While it general fall in standards in the service service have helped to bring about the service have helped to bring about the service service have helped to bring about the service have the service hav is true that the staff of computer users naed training in What needs to be done? points A B C D with regard to media, they also need training in the case of the amendant of the manufacturer, and the manufacturer, and the manufacturer, and the manufacturer. In the care of the equipment that handles that media.

the computer industry I have part of the daily touter seen great importance placed on seen great importance placed on what was called operator main-both, the maintenance of both the maintenance of tenance. This graduated to daily housekeeping but meant the same thing. It we applied in the data prep eree, as well as the computer room. Then as more computer manufacturers started to evolve, and compute for selections.

computer room. Then as more computer manufacturers started to evolve, and compete for sales, the need for operator maintenance, though atill thare, was never mentioned.

As long as you have moving mechnical ports, moving atatlonery, moving magnetic tape, moving discs the need will remein. Tape drive heads and transport area need to be cleaned, paper duet removed from line printers, card dust, from card readers and so on.

Ask any operator how many continuous services billy raguals services billity raguals services departments services departments services departments services departments services departments services believed to departments services billity raguals services departments experience a drop in service experience a drop in from card readers and so on maintenant Ask any operator how many continuous times he cleans the etylus on his peripherals. of his casserte player it's not Harrogales

pany, is to reintroduce en

by not creating them. Even those of the small and niggling vanety.

How Nixdorf help to keep the most

reliable car in the world on the road.

Because if you're like the Volkswagen H.Q. in Germany and have a distributed processing network of around 250 terminals, small niggling problems can soon add up to a twenty-four-hour major headache. Even if you only need a handful of terminals, you still want to

avoid problems. Which is why Volkswagen chose the Nixdorf 8820 distributed processing terminal system.

Ouite rightly, the DP manager of Volkswagen knew he'd have enough on his plate without having to worry about hardware or software malfunction. (Let alone what's perhaps the biggest single problem that besets a DP manager. That of reorientating people in existing situations to run and operate the systems.)

Leaving aside for a moment the robustness, reliability and superior

processing power of the 8820 we also decided to make it as idiot-proof as possible.

Hence diskettes which are impossible to erase and entry doors which are automatically locked when the machine is in action.

An automatic fault

going down, locates and identifies the problem straight away. (This makes repairs far easier for the service engineer, who, incidentally, will usually be with the machine within 3½ hours.)

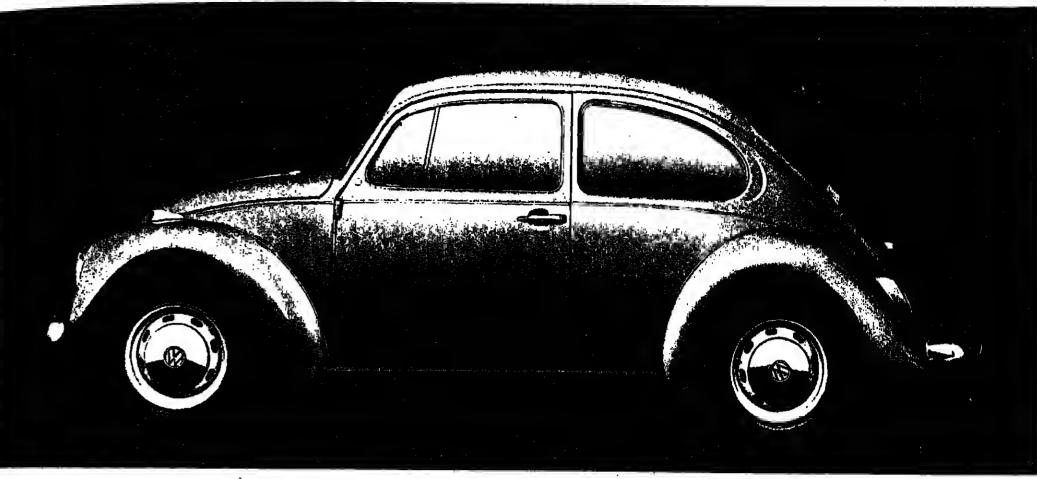
And a step by step operator guide which helps the operator to perform all functions correctly, first time round.

Another factor which could have influenced Volkswagen's DP manager's decision is the fact that the 8820 has, as we hinted earlier, processing power which is double that of the nearest competition within the price range. What's more the 28K core size can be doubled for only £1,300. (Compare that with £3,000 for an extra 16K from the competition.)

We'd like to think, though, that Volkswagen chose Nixdorf's 8820 by looking for a terminal manufacturer who shared their philosophy. That of making and supporting the most reliable, robust machinery on the market...

So, if you'd like to know more about the Nixdorf system that helps to keep the world's most popular car on the road, write to or contact Roger Neill on 01-572 3111.

# NIXDORE COMPUTER



# You are cordially invited to witness the introduction of Inforex distributed processing at the INVITATION Trade

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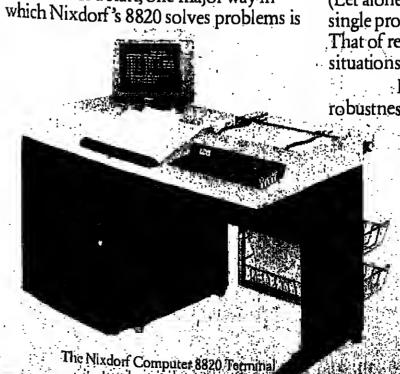
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you're the Data Processing manager of a

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attempting to institute a system that

looks after the new models VW are.

service centres. In short you'll have

constantly bringing out.

problems.

At the same time, you're

overseas markets, importers, garages, and

by Nixdorf's 8820 distributed processing

rather large car manufacturer.

full spares service for those fifteen

### **Fortronic** delivers

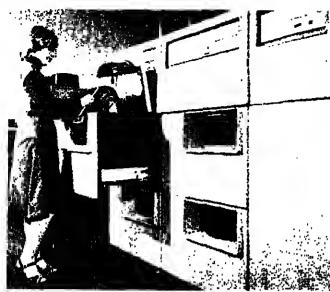
FIRST production prototypes of a banking terminal developed by Fortronic for the Clydesdule Bank have now been delivered. The terminals allow rapid

customer and account verification on each transaction. Clydesdale is planning to install them in all its branches to provide the basis for a distributed data network with centralised inquiry and data collection

Fortronic has also reached a draft agreement with Computer Industries, Iran, the government-backed terminal manufacturers, for a joint development venture on a terminal that has both Farsi and Roman type.

#### Paisley upgrades

A PRIME 400 minicomputer with 512K of memory, two 80 Megabyte disc drives and supporting 48 terminals, has been installed at Paisley College of Technology, Strathclyda, at e cost of £50,000. The low price was due to Frime's policy of buying back the first computer is customers install. The college bought a 256K Prime 300 early this year and traded it in for the



A NEW control unit has been introduced by BABF which anabian its IBM plug-compatible disc drives to be attached to the small 370 is in mainframn. Called the 6033 cantrol unit, the dovice, nhown here, will handle up to eight drives, including the BABF 6235 100 Mogabyte and 5230 200 Megabyte driven. A 6033 controllor and 6230 drive or equivalent to re IBM 3333, according to BABF.

#### Tymshare link Down Under

THE Australian Overseas also allow Tymshare to market Telecommunications Commission ia considering the installation of a node to allow users throughout Australia to access Tymshare's US packet-switched network. The main attraction to users la likely to be the wide range of databases ovailable on Tymnet, but the mode would

Ita service bureau facilities. Following the lead of the UK Post Office, most European PI'ls are now offering similar

services, allowing users to link to both Tymnet and the US Telenet packet-awitched network (Computer Weekly, Telenet

Following the recant theft of a Vantek System Op Spot considers the increasing possibility of computer systems being stolen . . . and advise

# As systems get smaller. risk of theft grows

morily be aimed at ensuring

the physical eecurity of stor-

nuet be controlled.

form of attack

heard around computer of cases it is applied to the safety of the data processing than the physical security of the hardware.

Many hundreds of pounds may be apent enauring that a system is available only to authorised users, by means auch as passwords and other software checks. Yet the physical security of the system is often entrusted to a simple magnetic card key access system.

The supervision and operation of this access system ia frequently abused; lost keys are often replaced without question, and seldom is the key mechanism changed.

The key access system does perform a basic job in restricting access to the com-

such Items as engineer loois, and smaller liens of The recent theft of a Ven-

tek system (CW, September 8) shows that physical theft is something we must fuce as a real possibility. Computer systems are growing smaller in alze, and feasibility of stealing a system is growing inversely. But security should pri-

age media, such as discs and tapes. These are the true ways in which a system can be dleabled, and magnetic media reculre protection. The computer area attracts many vialtors, who come as users to deliver and collect input and output, mointenance staff to maintain the system, and ordinary visitors

iods of closure. The system will also attract the attentions of malcontents, who see it os nn easy way of inflicting harm on the company. International organisations and companies are particularly prone to this

Fire is another danger Security guards, when employed, should be advised n the computer room, but his is o problem that can ensily be tackled, not only by providing ample fire-fighting equipment, but also by training staff in the efficient use of the equipment. A well disciollned fire-fighting team can

should not only be installed in the computer room and adjacent aren, but also in the air-conditioning plant room, stalionery sinre, and in false floors and ceiling voids. An adequate fire detection system is not a hixury, but ii necessity. The system should be designed to sound fire nlarms in the entire complex, activate nn alorm to notify the fire brigade, and automanctivnte the extinguishing system in the

Fire detection equipment

Theft is a problem in many nstullations. Steps, though not necessarily elaborate, should be taken to ensure that petty plifering is avoid-ed. This includes the theft of

More serious is the thelid

confidential data tel software. An accurate analysis of the computer log that's reveal any abuse of mathin time; but the physical aspect of the theft of processing time can more easily be avoided by changing the manning of shifts at regular intervals

Prevention la better that cure, and to this end many steps can be taken toloring the security of the system and installation. The securit of an inataliation is drasical increased if the computer housed in its own purpose built bullding altuated twa from the main complex Unauthorised persons would be identified more easily if who come simply to look. All these categories of visitors they attempted to approach the installation during per-

> illegal methods of access to the building can be restricted by incorporating as few with dows as possible. Where wh dows are installed the should be of toughened wired glass, and of the

in writing of any comput staff who will require acce to the building during en ings, nights or weekend whether they be worke regular shifts or on overling No staff member should be ullowed necess during the times unless there is write: authority with the securit guard to this effect. This m' should be inflexible. Add tlonolly, in order not to 50% the seeds of familiarity. security guards should t

changed regularly. A computer is a valuable piece of equipment, and deserves to be treated such. It should be reme bered that it cannot replaced "off the shelf", an its loss would cause serion disruption throughout i company. Replacement con in many cases take up to months, and even a loss t disc packs or magnetic tape could cause serious disaption to the company's daily

# Puerto Rico buys Honeywell Level 68 Multics system

THE first Honeywell Level 68
Multics system to be sold outside continental US is going to the Puerto Rico Highway Authority, Puerto Rico is the Corib. bean island administered by the US, and the Highway Authority needed the special secure features for which Multics was designed, because it intends to aell time on the machine to outside usere.

As well sa being designed to isolate each user completely from all others by the use of Honeywell the contract of IBM, the resident supplier with IBM, the resident with IBM, the resident

Honeywell the co

# Word processing conference

A TWO-DAY conference on word processing aimed at those involved in the growth of information handling eystams, is to be held on October 25 and 26, at the Ragent Centre Hotel, London.

Under the title "Putting Word Processing Into Perapeetive", the conference, organized by On-line, will look at four points:

# WORDING SORNEWS

# Low-cost system to debug Z80 programs

AS the majority of design effort in realising microprocessor-based applications is proving to be in software rather than hardware. Zilog has produced a low-cost program Development System specifically for debugging and developing software for

Al s cost of £2,100 for a minimum configuration, the system, called the Z80-PDS, generally obviates the need for hardware development effort by utilising in its construction boards from the Zilog microcomputer card range, in this way, software developed on the PDS can easily be transferred to the target microprocessor system

constructed of boards of the same type.

The basic configuration consists of a single floppy disc drive offering up to 300K byles, I&K bytea of read/write memory and 3K bytes of PROM. It also includes a serial I/O with RS-232 or atrappable current loop interface.

This can be expanded by o variety of option system modules that include the 280-108 I/O board, the Z80-SiB serial I/O board, the Z80-VDB video display board and be programmed on the board directly by the system, once the applications software har been developed. the 780-PPB PROM programming board. The latter allows a variety of PROM devices to

The hardware is packaged in two units consisting of a card enclosure, complete with power supply and space for four cards, and a floppy disc drive. The software for use on the PDS is the same as used on the Z80 Development System

and the Z80 microcomputer family. It includes a disc realdent operating system, editor, assembler, debugger, and file handling utilities. As the system's read/write memory con be expanded up to 32K

drivers and receivers offering

provision for CCITT V24 trans-

mission, a 14-bit programmable interval timer and a four-level

vectored priority interrupt sys-

Sockets are also provided for up to 4K bytes of non-volatile

program storage and the line

drivers end receivers that are

user selectable to configure the

parallel I/O to sult particular

applications. The parallel I/O

lines are brought out to an edge

connector that can be mated

with ribbon, woven or round

register which can be examined at any time during or after a simulation run. This will show

the exact count of targat

machina cycles. Altarnativaly

the clock can be set to a negative

value representing the time

saga when the time has elapsed.

The program is avallable on a

cables. The serial I/O can also be

bytes, Zilog has taken the opportunity to make available two issembler options, one specifically intended for operation on the

Although the Z80-PDS can be operated as a atand-alone system ilog foresees a considerable market for it acting as a satellite to the 780 Development System. Up to four PDSs to one Development System can be operated in this way, reflecting the ratio of computing power required by software and hardware development

The price also reflects the generally lower level of finance available in Europe for microprocessor-based applications development. Much of the initial effort in realising the Z80-PDS cane from the compuny's European operation.

# Intel adds to SBC range

A NEW single board computer serial I/O lines with TTL line specifically optimised for use in stand-alone applications such as programmable controllers. remote data galhering and intelligent peripherals, has been added to its SBC OEM range by

The SBC 80/04 operates from a single 5-volt power supply rall, and is available at a cost of £72 in quantities of 100 units.

The heart of the board is an Intel 8085 8-bit microprocessor. A read/write memory of 256 bytes is provided in static RAM, and the board also includes 22 programmable parallel 1/0 lines,

# Comart widens its service

MICROCOMPUTER mall order fault correction and debugging and retail specialist, Comart, is widening its service capability service for both hardware and with the provision of a hardware Comart is also releasing a nd software consultancy. catalogue covering S100

Operated for the company mainly by freelance specialists, the service will provide a kilbuilding facility, together with advice on hardware, and a bus-compatible products from Cromeco, North Star, Dynabyte, Franklin Electric Corp and-IMSAI, for which it is UK

# MicroSim addition

AN addition to Pactel'a Micro-Sim enables users to relate microprocessor simulationa to real time.

Ilmes on the eventual largat microprocasaor ayetem. The program incorporatea a "clock"

Known as MicroSlm 8080, the program is an inter-assembler hat combines the ease of use of an interpretive approach, with the efficiency of a true jointly by Pectel and D. M. England and Partners, both intel

available for a program. The simulation will halt with a mes-Object of the naw program is to overcome the main shortcoming of most cross compilers diai-up time shared basis from that they give the program-mer no indicetion of execution Allen Computer Sarvices, or for installation on the user's own

Double density diskette system AS part of its intellec 888 microcomputer development centre, intel has introduced a double density diskatte aystem that can operate with Intel Designated the MDS-DDS.

the diakatta system utilises a soft-sectored format for data thal can operate with Intel development system that a million bytes to be stored development systams as a stand-alone item! 199,161 on each disc, in up to 200 separate files. **本日生代出海原在警院** 



# Micro-based unit replaces TA 10

10 office computer of which more than 1,000 have been installed in the UK, is to be superseded early next year by e desk top edition to the microprocessor-based TA 20 regian taking a shere in Adler amounced seriler this year. Costing about £3,000, the machine will be called the TA 20

Compact and will be usable an a typewriter and calculator as well sold by Triumph Adlor's UK subsidiary, Adlor Business Systems, atong with the rest of the TA 20 nories (CW, July 7). This meann that Office and Etectronic pany that has sold the TA 10, will case handling Triumph Adlar accounting products. However, OEM will retain a

office products and negotintions ore taking place between OEM and TA that could leed to OEM

The TA 20 Compact will come with an Intel 00B0, n 3K RAM and a 7-12K ROM, e 132-column printer with a golf ball - oingle element as TA prefera to cnil it — print head, end a cassette unit will be an option. It will be about the same size as n large type

Bigger TA 20 modeln can be nuppiled with matrix printnes and magnetic ledger card units and cost up to £10,000. The more powerful TA 1000, of which about 400 ore now installed in

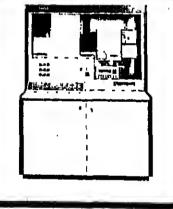
### Mostek design workshop

A TWO-DAY microprocessor design workshop, to be held by Mostek UK next month, will provide instruction in the hardware and software aspects of the

Almed orlmarily at engineers with little or no experience of micro-computing, the workshop will cover the Z80, Z80A, their peripheral family, and associated atatic and dynamic memory system design.

The course, to be held on October 6 and at the company's London headquarters, la limited

# Spotthe difference



On the aurface you can't. But each is very dillarent. Bacause although the new KODAK 'Kom-80' Microfilmar,

Modal 2 ia a aingla machina, it's modular. Which maana that it can be

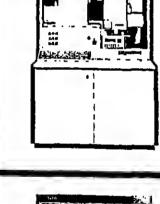
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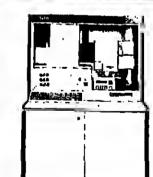
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# Most people aiready have a Reality user's manual

Reality understands English. So the obvious place to find the right words for Reality is an English dictionary. Choose the most useful words:-check, sort, list, control, inventory, value, together with those particularly associated with your type of business. It's as simple as that.

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enables a whole series of operations to be originated with a single on the Reality business system.

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representative

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THE RECORDS REVEALED THAT THE RINGS, OR HENGES, DOTTED OVER BRITAIN ONCE FORMED PART OF A DISTRIBUTE PROCESSING







punch girl Bella made a startling discovery

which adds another dimension to the concept





IT'S tough at the top . . . a move by David Finsn (right) a computer operations shift leader from Newcastle, is wetched closely by apectators at the final of the British Othello Championship hold in London earlier this month.

Finan was beaton by two game

to one in the finel match by the

new British chempion, Joseph Woch, e representative for a pharmacautical firm. Woch goes on to play in the World Chempion

ship in Tokyo next month. Computer Waskiy Othelio offer: see page 6.

Wally Wells, who has been with Dstasaab UK for the past three years, has been appointed deputy

managing director of tha company. He had been managar of the South-ern division of Datasasb for some

BIS Applied Systems Ltd has promoted two of its amployees to principal consultants. Howard Beals

was previously a senior consultant end Paul Green was a project

manager. Another appointment announced is that of Ray Beasley, previously software tesm leader

th Automobile Association

Basingstoke, as an associate consul









### **New German** office for Racal-Redac

RACAL-REDAC of Tewkesbury, Gloucestershire has opened a new sales offica at Bansberg, near Cologne in West Germany. It would serve a large area of North Garmany to meet a growing demand in the field of computer aided design

/stems. Racal-Redac already has its headquarters in Munich, established nine months ago for the company's printed circuit board deelgn systems. The Bensberg office will be run by John Babbington as sales manager in charge of the offica.

Elected a member of tha council of the Institute of Statisticians, is Barry Quirke, managing director of the CRC Group, Last year he became a Fellow of the Instituta, of which he has been a member since

Aian Savaga, now product manager of Extel's computer pro-ducts group, was previously with CASE as a sales enginear; Alan farks, who has become sales engineer, impact printers with Extel, was formerly a sales engineer with PKS.



Tom Vsientine, latterly chief accountant at Backman Instruments, has become financial con-troller.

Wright Air Conditioning Ltd of Birmingham, has appointed Russel Miller as a senior development engineer to deel specifically with that development of new products. Hat was previously a project angineer with Stone-Plett Crawley Ltd of

Roy Staines, formarly s project manager in management services division of C and A Modes has been retained by Compute (Bridgend) Ltd as a markating representative for all CBL software.

Gordon Stricklend has baan appointed as manager, systems and marketing support by Sweda International (UK). He was formerly with NCR as a retell systems support

Bob Mail has been appointed director, financa and administration with Honeywall Information Systems UK, effective October 18, He succeeds Dick Versol who returns to the Stetes as vice-president, finance end atiministration. Mail was previously director, financial planning and analysis in Honeywell's management diffe in Min-Francis Rowe has become director of systems marketing programs for Data General in the US. He was formerly head of special marketing projects, and director of product marketing Lawrance Salignen the Stetes as vice-president, finar becomes director of small business systems development; formerly he previously director, financial plants head of the systems products in an analysis in Honeywork and the product of the systems products in the systems are the systems and analysis in Honeywork and the product of the systems are the systems and the systems are the systems are the systems and the systems are the sys



Distributed computer control systems international conference. IEE, Bir-

AEPTEMBER 27 aEPTEMBER 27
Distributed intailigence, seminar, BCS, Café Royal, London WI, 9.30.
Computer fraud. J. M. Ross, BCS, Birmingham branch, Priory Dane Hotal, Edgbasion, Birmingham, 18.30.
The man/machine interfaca, Mike Cuolcy, BCS, S Woles hranch, Central Hotel, Cardiff, 18.30.
Note: BCS Natural Language Trunslation Specialist Group meeting has been The minicomputer and in ten-il commercial DP. Martin Heighton Time Users Group, Staff Rese, 1: sity of Sirmingham, 1430.

Introduction to the Wasse Schistorical view of processor before Peter Ford, Dr R. M. Bett. Nottingham branch. Ti Min Le Theatre, University of Nottingham

Datafair 77, the end use brounference. BCS. Cumari hasters Hotel, London Wil. Details Opt. St. 1cl.: 01-242 2481.

The new ANS Forms sub-growth of preprocesses & Irr. Specialist Group. Cunan home. Hotel, London W8, 18.15.

PL/I. what's in it for you's to barker et al. BCS PL/I Special (2) Cunard International Holat Labor 18.00.

CADE, computer sided des

engineering in telecomme Esta . SCS South Essex branch The bath Bastidon, 18.45.

Regional slectrools instructions tion. Electronic Promotion Decay trial and Trade Pairs Led Eury.

Computers in a law offer to:
Andrews. BCS Law Specials (\*;
Polytechnic of Cantral Lawin law
WI. 1800.
The use of computers in the 'an
services. BCS Medical (Lawin law)

Group. Cunard International London W& 14.00.

Announcement

AS THE Summer Computer by.

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Winter Knock-Out Cop is m

All interested leams, of 09 r.

whether from the league a . should note that there will

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work out arrangements or Donny Borahem on 01-240 L

Tickets for the Summer Is

river Imp on October & ses available from Danny Borbs

£2.75 each.

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OB 1-928 5256.

OCTOBER 44

OCTOSER 5

OCTOBER 5-8

CTOBER 6

ilon Speelslist Groun meeting has been cancelled.
SEPTEMBER 27-28

rling, IBM Computer Users' Asso-ii System 3 Group, White House

SEPTEMBER 27-30 Annual conforenea. Operation Re-saarch Soelaty. The Queen's and Magdalan College, University of Oxford. SEPTEMBER 28

Computer access to large databases sing alternative store technologies. Ken using alternative store technologies. Ken Groves, Pater Waterworth, Roy Brierley. BCS Information Retrieval Specialist Group. City University, London, 14,00. Tickats £1 from Pauline Walters, at the SCS, tel: 01-637 0471.

The protection of date by cryptography, seminar, NCC/NPL, Cumberland Hotel, London W2, 10,00. SEPTEMBER 28-28.

SEPTEMBER 28-29

Meeting IBM Computer Users' Asso-ciation Local Authorities Group, Hamp-shire County Council, The Castic, SEPTEMBER 29

Annual dinnar. G. A. Flaher, guest of honour. BCS Advanced Programming Specialist Group. Tiekets £8.00 from Prof. P. J. H. King, 10 Gower Street, London WC1, 19.30. PL/I in a CMS environment. Tony Smith. BCS PL/I Specialist Group, LSE, London WC2, 17.30.

#### SOCCER

OCTOBER courses from Hoskyns OCTOBER courses from Hoskyns includa: programming management, October 10-14; project managers, October 10-14; commarcial systems snlysis (four one-week modules). October 10-Novembar 4; operations supervision, October 17-21; computer systems dasign, October 24-28, for details of these and more, contact Valerie Ourr, Course Registrar, John Hoskyns and Co Ltd, 91-93 Ferringdon Rood, Lundon ECIM 3LB, tel: 01-242 1951.

A THREE-PART course of lectures on computer architecture is held by Brunel Jaiversity. It is organised as a series-of University. It is organised as a series—? Isiks, each presenting an overview of a particular field and runs from October until June. Each talk is complete and can be attended independently of the others, or students can register for one or more terms. Further details are aveilable from R. M. Lea, tel: Uxbridge 37188 ext 335, or Ot-886 3823.

# Centronics to enter end-user market in a major policy shift

marketing policy in Europe was revealed by Terry Harris, vicepresident of the company's uropean operations, in London

litherto Centronics has concentrated almost exclusively on the OEM market, and although this will still account for a major share of the printer manufacturer's business, Harris sald that "as part of our expansion plans we have decided to begin seiling actively into the end-user and data communications markets in Europe ... We see the enduser market representing a algnificant portion of our total

European revenues." The way in which the anduser market is served will vary from subsidiary to subsidiary. The UK company will operate through end-user distributors: Cable & Wiraless In England and Wales, Dacoll in Scotland, and Cara Data in Ircland, with Cable & Wireless undertaking all third

party malni enance. In Germany, Centronica will undertake its own end-user selling and maintenance from offices in Frankfurt, Hamburg and Munich. And in France the company will usa its own sales force in the Paris region but will operate through distributora in

Spearheading · Centronics move into the and-user market Is the 76), a 300 baud teleprinter which is ovailable in RO and KSR versions, with a yarlety of optional features including an APL character set.

the provinces.

The 761 APL will be shown for the first time in Europe at the Sicob exhibition in Paris, which will also be the occasion for the official onnouncement and first showing of the 702, a 120 cps bi-directional matrix printer.

Also being exhibited for the

AMAJOR change to Centronics' first time in Europe at Sicob Is the Micro 1, a low-cost (\$745) non-impact printer developed in association with the Japanese manufacturer, Sharp, The Micro I prints at a rate of 180 ipm, with up to 80 characters per line, by way of electrical discharge on to

aluminised paper. The Micro i stands very much outside the line of development represented by Centronics' more conventional impact printers, but the company sees it as being particularly suitable for industrial, test equipment and mobile applications; for producing VDU hard-copy; and as an end-user product in the hobby market.

Following Sicob. Europe's next major computer show. Systems 77 In Munich, will see the official release of the 783, a 1200 baud teleprinter which wes previewed at the NCC in Dallss earlier this year.

According to Tarry Harris, the last' 12 months have been o period of intense activity for Centronics in Europe, The European headquarters and the UK subsidiary are now based in new offices in central London. In Germany the Frankfurt offices have been expanded twice, and sales and service offices have been opened in Hamburg and

In Paris, too, the company has just moved into new offices, while a new subsidiary is being set up in Italy.

In ireland, Centronics is planning to move from a leased factory to a new purpose-built The head-count of European

employees has risen from only five two years ago to neerly 80 loday, not counting the employees at the Irish plant. And Europe now represents 20% of Centronics' worldwide reve-

Tim Palmer looks at four major new products UK launch of ITT's



John King, director of marketing, ITT Business Systems, is a gra-duate of Bristoi University and has some 20 years' experience in the DP industry. He has held senior positions in systems anyincering, general manegement, consultancy and marketing with IBM, Telex Computer Products and Metra Consulting Group.

FORMED four years ago, LTT Business Systems brings together a number of ITT units

with the grand strategy of

In the context of the electronic

office, the compeny is therefore a major challenger for the mariest being developed by 19M through its Satellita Busingss Systems venture, AT&T in the US with its

plans to expand into date pro-cessing services, and Xarox,

which needs to divarely awey from its dependance on the

copiar (CW, July 29).

The main elements of the company ero the teleprinter specialist Creed, the company's PABX and massage switching potential,

davaloping a total commitions natwork capability.

tive to IBM'a Systems Natwork with IBM'a 3270, and ITT claims that over 10,000 units are installed and on order through-No major enhancements have

> advantages over the IBM 3270. The key item among the new

Formol UK launch takes place iTT products is the 3805 communicationa proceasor, which at the beginning of October, and the portfolio has been alimmed comes from ComTen of Mindown to four major products. neapolis and competes with The 3470 key-to-floppy dlac iBM's 3704 and 5 devices. system built by ITT In Spain is The 3805 allows much more of

not yet offered in the UK. the communications processing Starting point for the portfolio is the well-established 1TT 3280 load to be handled outside the 370 mainframe than does SNA cluster terminal system which and ITT believes that It will ITT gets from Courier of Phoenenable users to bulld hiersrchical networks without the need **Grand strategy** 

the 4000 series, which includes

the lerge 4090, currently under-

the lerga 4090, currently under-going Poat Office approved procedures, and the 4040, which is barred from the UK by the Post Office monopoly on small PABX equipment. The message switch-ing equipment includes the ADX 600 and 8000 store-and-forward

ayxtems.

It is a lerge company, employing some 14,000 paople in
Europe and doing annual buelness worth £300 million. Biggest
compleint of merketing director
John King is the difficulty of
recruiting anough suitable people
to enable the company to fulfil its
botential.

to upgrade their mainframe. In addition, one 3805 can front-end two aimllar or different mainframes, and the device is usable both as a front-end and a remote concentrator for more economic line use. The 3805 handles terminal polling, and a Terminal Initiated Line Switching package enables the terminal user to switch between applications and software pack-

ITT has a second processor, the 3807, for people needing a front-end with more line capac-Itv then the 3805 offers. The two

SNA for people wanting to use some of the IBM devices, and yet been made to the 3280, but IBM has announced major non-standard terminals are also supported. Improvementa to the 3270 which The ITT 3830 is a new range of iargely remove ITT's competiremote batch and remote job tive edge (CW, May 26). In response, ITT is discussing davelopments with Courie which will again give the 3280

entry terminals acquired from the Massachusetta-based Linolec aubsidlary of 3M. The smail intagral processor which takea up to 32K of main memory is built by Linolec, and there is a microprocessor to handle communications. Programming is in assembler, and utilities, diagnostics and a data entry generator are also included. Secondary storage la on two to four 256K-byte floppy disc drives.

3805 can emulate the IBM Haap

Compatibility is offered with

multileaving workstation.

There is an integral VDU and keyboard, and other peripherals supported include magnetic tape, card reader, badge reader, character and line printers. Large cartridge discs are to be introduced shortly.

Emulations offered include IBM 2780 and 3780, ICL 7020, Burroughs ond Univac, and communication is at up to 9600

The 3230, built by Courier and developed in conjunction with ITT, has no direct IBM counterpart. It is a teletype-compatible lay system for data entry and file inquiry and updote. It offers floppy disc storage, and one printer can be shared between several display sto-

# EMS aims for £2m from small firms

LATEST contender for a share new systems from scrntch. of the feat-growing small business systems market la Executive and Menagemant Services, **EMS** Consultants.

The company aces a potential market of 30,000 businesaes employing 100 or more people. and plans to "markat the essential almplicity of computing without confusing the customer

EMS plana to offer systems at a hardware cost of between £15,000 and £30,000, and is developing application software packages in Cobol for lease to

The main packagaa are being developed for October ralesas. covering financial managament, sales order processing and payroll. Each packaga will cost about £1,000 a year to lease, but

EMS has chosen the Honeywell Level 6 minicomputer for its new venture, and has placed an OEM contract with Honeywell for 50 minls over the next

16 months. EMS has installed its own 6/43 mini in a new customer data centre at Five Ways, Birmingham, and customers are promised same-hour enswers to

EMS will also tailor packages to user'a requirements, or dealgn

software queries when they use the "hot line" to the data centre. Tha software peckagas are being written to be compatible with those available for the ICL

EMS is designing what it calls "new concept" workstations for the system, which will ellow two operators to share the VDU.

The company is looking for £2 million of business with the systam in 1978, and £4 million in 1979.

#### **USAF** satellite launch

A JOINT National Aaronautica satellite will be launched by the and Spaca Administration/US Air Force project is to investigate diaruption of communica-tion satellite services caused by

investigate conditions at and hear the geostationary orbit height of 22,300 miles. Two NASA centres, the Mer-

US Air Force in January, 1979, to

charged particla bombardment Two NASA centres, the Mer-from the atmosphere. shall Space Flight Centre in Cailed SCATHA (Satellita Alabama, and the Goddard Charging At High Altitudes), a Space Flight Centre in Maryland sciantific instrument package are taking part in the project.

### Harris wins \$8.5m order

UNDER what is claimed to be the biggest singla US Federal procurement for computer terminals, Harris Nashua Opera minais, Harris Nashua Opera-tions, formerly Sanders Data Systems, is to supply 200 Harris \$171 remote terminal systems worth \$8.5 million to the US Defense Logistics Agency over the next five years

The Harria equipment will be installed at 22 sites all over the US and will be linked in IBM 3270 mode to mainframe com-piters. The applications will be data entry. The inquiry, clata-retrieval and distribution con-trol relating to the \$8 billion worth of goods that the Agency slipplies to the 16 armed forces









Company of the Control of the Contro

COMPLETER WEEKI V-Contourben 15 tone COMPUTER WEEKLY, September 22, 1977



# Why many of the big firms have 'gone West' By Alan Halfacre

attrecting members of that 2900 centres.

the working and social a 20-mile radius, some-environmenta. The image thing worth keeping in that is created of these two mind when considering job £10,500 and £12,000. areaa is fundamental to the aucceas of attracting and keaping key staff. My expe
mind when considering job areas is fundamental to the apportunities. System 4 and take tha opportunity of small town life within 20 rience of the West Country computer spectrum of the minutes of the computer leads me to believe that area. Among the hordes of Swindon would offer deprobably in both areas the 1900s there are some Sy-employers underself the stem 4, notably four machl-perties at £14,000 upward

In the West Country, Briatol. local authority end central government inatailetions others but they are gener-tend to be bigger and ally in the small machine thicker on the ground than business with the occasio-in most parts of the UK. If

Looking at the job prospects in the West Country, Alen Halfacre, of AMJ Halfacre and Associates, and marketing consultant at W. H. Smith's computer centre, writee of the wide choice evellable in commerce and industry and says, "it is difficult to find any sector of business that is not represented by one of its major companies.

with Bureau West, RAF inneworth, the Universities, Water Authorities and CEGB all seem to be in the you that the West Country throes of major conversiona has everything or any that to new and in moat ceasea significantly enhanced configurations Doraat County one should not get the Council among others is impression that it is aven Council among others is impression that it is aven well ahaad in its planning further out than the or a new 2000 system.

In the field of commerce generally wear smocks or and industry the choice is chew straw, although it is just as wide. If as an analyst you have experience in the high technology industries then Rolls Royce and BAAC have significant installations in Bristol. On the retail and distribution side there are Imperial Group, W H no concerts. How far from Smith, F W Woolworth and the truth can you get? Detembers To cover the For a stert its worth oil industry there are Bur- examing how often you use mah and Castrol and as for those facilities when living

any sactor of business that West Country folk than the is not represented by one of commuters from the Home Its major companies. For Counties, more detailed information Locel facilities are good on companies in the area, and you heve the added refer to the Computer Users advantages of eli the things

used in the area the main- ence - Poole Herbour or frames merkat is shared tha Cotswoid Water Park primarily by ICL end IBM. for salling and Cheddar for Significantly, I am unable to climbing etc. The opan alr recail a 370/168 alte; pursuits are elways to hand comeons no doubt will be and the classical cultural keen to enlighten me but activities need naver be far from 15 downward there away.

from Which to choose The people seem to have any nies. Do not forget that a significant proportion of the

Of course, there are the

exparience convinces you da's duai Univac 1110. that the ICL 2900 range is Again the wide apread of the place to be, then MOD mainframes should not

dater the best in all fields of computing.
I will not try to persuade "atloka". People do not

insurance there is London and Manchester, end so on. In fact it is difficult to find ton is often nearer for the

ear Book. that people travel across
Looking et the hardware England to do — for instdifferent compenies for the

IN this thumbnail sketch of the computer industry in other parts of the country, the Weat Country, I will outline the problems employers feel they have in attrecting members of that tions. Don't expect a think they will be disapinduatry.

The basic problems of recruiting in any sphere of technology are divided into the working and sould be a seed companies within the pointed.

Zero centres.

Swindon certainly seems three-bedroom semi with a pointed.

sea view at Torbay for existing or planned 2900. Elso,000, but think about Swindon or further weat the pointed.

employers underself the stem 4, notably four machi-potential opportunities. - nes in Bath and five in and semis at £12,000 plus, all within a radius of 10 miles. Certainly for those moving into the area from the London commuter belt, life Is different, but housing and achools should present no

> So If it's really so attractiva why isn't everyone flocking to work here? Having discusaed the altuation with a number of companies it appears that their views come down to two basic erees of concern: There appears to ba e dearth of adequately exparlenced steff on the markat. Thia is necesserily exist but under present economic circumstances job security ia put above all things. No one wants to be last in, first out. Additionally it appears that agancles ara not clearing down their books so that they ere becoming less

The other aspect, it is widely feit, is that the right staff are not available at the right price. One company said it would not accept experienced ICL operators for their IBM system, it being easier to use trainees. Certainly, W. H. Smith has felt that finding experienced system aupport staff is difficult because they ere so few and far between and those that do gain experience in industry often

I have not delibarately avoided discussion on aalaries; I do not believe thare is much to ba said. Every company hes had problems due to the pay freeze but any differentiel between say London and West Country retes is swamped by the variance in salary paid by

In summary, if your experience is with ICL or IBM, or if you heve no experience at ell as an operator, analyst or programmer there would eppeer significant proportion of the

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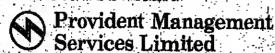
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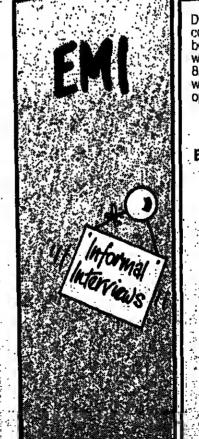
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products to do that job.

in their operation.

Obviously the third option must be cheaper for you in the short term, but to some extent you lose controt of the product's presentation, and you certainly e quite a large amount of the product's purchase price.

Tha agent's share can be ng close to 70 per cent of e price if he la also providing technical support: at the least he will demand ween 40 and 50 per cent.

On the other hand, the age knows his market and is pro- on the activities of its outlying bably well established in it, aales offices. clearly you would not have picked him if this was not the

Setting up a local company has its own problems. For Instance, it is not easy searching or oppropriate offices from a base 400 miles away, dealing in a fireign language with foreign employment and building-use

The estate agent is likely to be only the first of many paople who could take you for a ride. And how do you find and assess sultable candidates for the all-important front-office jobs the secretary, receptionist, leiephonist?

Even the apparaments.

Even the apparently trivial details — like how to get your now telephone number listed in the phone book and the appropriate commercial directories priate commercial directories -Our experience is that it will

# exporting software computer industry in general has moved out of those much-By Alistair Jacks

Technology costs have been falling end business costs have been rising; both factors hava Suppliers of services heve been forced tended to helgitten our awaretake e more reelistic ettitude ness of the computer as a profit towards the operation of their busicentre in the organisation, with nesses es of late. And the software acquisition and operation costs side is in the forefront of this trend. offset against positive

overseas country - ond that'a

when a local man does it.

While the merket is specialised, its expicitation still requires the same skille es for other merkets. This is

take three or four months at can seem comparatively easy after all that. There is an least to establish an office in an

aatonlahing similarity between

BM users, for instance. This is For a foreigner the taak will the principal market for CPP probably need nine months products, and we find that the at least. And during that time North American bias generally very little effective marketing 360/370 documentation is in English, considerably simplifies

Taking right steps in

will be possible. Computer Program Products, the international product mar-keting arm of the CAP-CPP the job of selling IBM-compatgroup, operates in eleven coun-tries and it has been CPP's policy to employ nationals of the countries in which we operate. This definitely speeds the startup in terms of getting an office operational; and of course if you take on the right person, you can effectively be buying a quick start to the marketing opera-

tion. Your local manager will be tonment of buying and selling, the software products end of it is getting there faster.

At the same time it cannot be someone with experience of the local market and local commercial practice. This can be critical. In at least dealed that the market is still a one European country discreet kickbacks are still the normal specialised one, requiring consiway of easing one's woy through

derable speciafisi knowledge the bureaucracy: It could be disastrous for a British manager and consisting of buyers that require a good deal of expertise from any salesman.

Assuming that the vendor has decided that exporting is desirable it is simple a continuous. not to know this. It could be equally disastrous for him to get the country wrong.
There are also national differable it is simply a question of

ences to consider. Belgium, for example, has a 13-month year for salary payment, so be wary when you quote a monthly remuneration to potential em ployees. Also the provision of company cars la much lass ommon on the Continent than lt is in thia country.

There is also the problem of recruiting aalesman. It is hard enough to recruit people in the UK, the place we know beat.

CPP's approach was originally to convert technical paople to a selling role, but now we are moving more towards the recrultment of professional salesmen and the internal investment in training new people.

Selling is a vary emotional business, it is vital that the local managar should feel that he or ahe has tha autonomy and responsibility to run the local

It is equally important for the inevitably there is a good deal

of resistance to Head Office checking up on tha local operation, but at the same time the local offica needa a good level of cantral aupport moral, technical, and manage-The general manager of CPP

apends ovar half his tima travalling around the group's various locations A strong reporting system has also been

And the group has, where possible incorporated national offices as subsidiary companies, making the local manager a director and thereby giving him status and responsibility, as well as getting over the more prosalo problams like dealing with the VAT office and signing cheques, both of which have to be done by a company officer.

The actual business of salling. particularly so for exports.
The UK is the softwers world's

'bargein besement" end Alisteir Jacks eeks that prospective exporters think carefully shout the way in which they epproach the problem.

He offers suggestions for evoiding some of the pitfells for firms entering

ible software packages

In the metropolitan areas

especially in Holland - there fo

areas where the paucity of local

job opportunities and the desire

the eoftware products export field. Alistair Jacks is the country manager of Computer Program Products (UK) which is the international softwere products marketing arm of the CAP-CPP group. CAP-CPP is a member of Insec, the NEB's computer

to ahare probleme meane that

one sale for a product can

quickly lead to othera amply by

can be an extremely expensive

feature of the software products

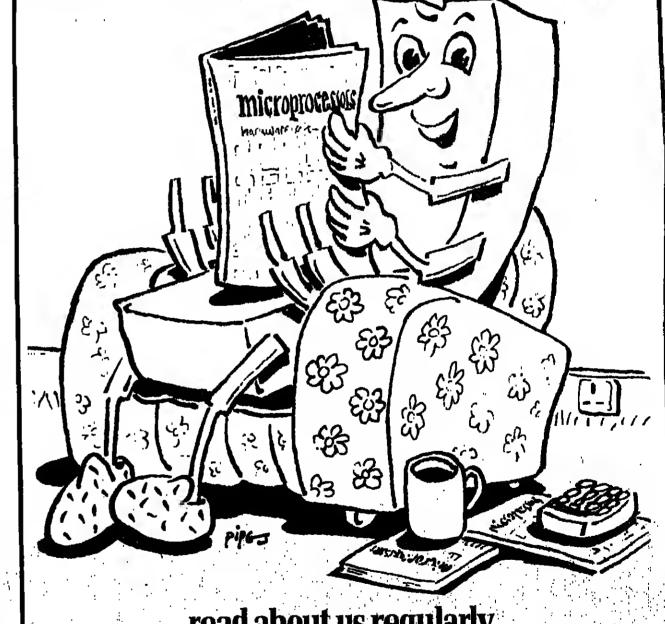
a willingness to use indepenhe word of mouth contact dently-supplied software and a good deal of knowledge about Support is the other important factor. No user with any sense la And nt the other extreme, there are some relatively remote supported product, but support

for microprocessors, and it runs on a Digital Equipment PDP-f1 minicomputer.

We did consider organistng agents for Micro Ade. It is, after

all, a very different product to IBM packages But our dicated that by promoting MicroAde through the present CPP system we would achieve ignificant market penetration at least a year before any a gency

That brings us to North America and the Insoc connection. Inaac Data Systems la the NEB subaldiory that is currently formulating its plana for the overaeas promotion of products and services of its members; MicroAde could be the first product that is pushed through



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second

ALMOST a year to the day after installing an ICL 2970, the big

burea u subsidinry of BOC Datasolve, has ordered a second

The new 2970 will be installed

alongside the first late next year

at Sunbury-on-Thames. Thia

expansion will not affect Datasolve's orders for an Amduhl

470V/5 and an IBM 3033 (CW,

2970

# Bringing the power of the system directly to the job

the pocket calculator on perao-

harnessing computer power for tangible user benefit and for the majority of organisationa, the employment of dlatributed computing techniquea ia likewiae

puters and microcomputera during the last 10 years has made available to the users a wide variety of systems capable of undertaking many of the business computing jobs for-merly undertaken by large mainframe computer systems. After a alow start. In recent yeara, the development of effective aoftware to enable these mini and microcomputera to be used in a buainess environment has proceeded apace and with some consider-

A gating factor on the widespread use of computers haa and occupying about half the alwaya been the complexity/

# the child of micro electronica and effective user interface software. It marks a fundamental change in business computing comparable to the effects of the pocket calculator on personal comparable to the effects of the pocket calculator of the poc Distributed computing brings the power of the computer directly to the job rather than the converse. It is an inevitable evolutionary development in harnessing computer power for

difficult it is to find people competent to use it. Remove the complexity, lower the threshold of competence and dramatically reduce the price of the product, and the market place for that product dramatically increases provided that the product represents a coat effective solution to tha problem at hand,

Micro-miniaturisation has reduced the cost of manufacture of central processora and the significantly reduced the cost of disc storage, Today's micro and using standard power supplies floor space of a standard office

# By Mike Aldrich

fectors in distributed computing, says Mike Aidrich, marketing director of Redifon Computers. He shows here how these factors have led to big differences between the uses of distributed computing in Esst and

desk for a system with central processor, 128 Kbyte memory. 10 Mbyte diac and magnetic tape unit. The user interface into the system is no ionger through the old techniqua of cutting holes in places of cardboard, sometimes called card punching, but rather through the interactive use of visual display units.

ever, has been in the software

area. The new systems manage to make the complexitles and aophistication of virtual memory, re-entrant coda and multitaaking operating systema, completely transparent to tha usar. The usar davelops his programs using Interactive compilers and English-ilke atatemanta. The operator entering or retriaying data from the system is cued by the ayatem through the operational

The nature of business computing has changed. No longer is the user emphasis on the batch processing capability of the mainframe but rather on the ability of the system to concurrently handle large numbers of terminal devices interactively and inexpensively. This does not mean that the mainfromes are now or indeed will ever be, obsniete, merely that their role has changed from one of general purpose computing, that is the ability to do all kinds of computing, some efficiently, some not, to a role where in future they will be undertsking limited tasks for which they nre

pre-eminently suited. The new role has been signalled by the onnouncement of network architecture driven by mainframes and comprising numbers of connected compu-

Distributed computing moves the power of the computer to the job, but as the job will normally be an intrinsic part of the overnil business, then the results of the transactions will have to be communicated elsewhere. Data communications and distributed computing ore therefore closely

To date, computer data comnunications has been adequately defined as the twentleth century equivalent of the Tower of Babel. However, the impending implementation of the new International atandards of High Level Data Link Control procedurea married functionally to the X25 awitching protocols at last provides a atandard Inter-computer communications

The old business organisation maxim of standardise, rationall-se and almplify has been brought simultaneously interface with bear on one of the most important areas of computer operationa. While it will take some years for manufacturers to fully adhere to the new atandards, at least we now have a atandard method of computar data communicationa aultable for land line or aataiiite and offering an effective atarting point for the next 10 years development in data communications. In the interim manufacturers' proprietary protocois will continue to be used.

The social implications of distributed computing may well relecommunication facilities prove to be more interesting are either very poor or non-exithan the technical innovations. commercial computing centred voice communication not data around the astabliahment and communication. Rather than development of computer degrue the existing mainframes, partments within business, fit therefore, into larger scale processing in atlants. than the technical innovations. stent and the ovar-riding prior-During the 1960s the growth in the provision of hetter

Identify. Large scale systems expensive and demanding of foreign exchange. The white train and develop people is advanced computing is limited because of the limited numbers. specialized environments in which the equipment had to run, and the demanda of specialist personnel who were in short supply. Co-incidentally during the 1960s organisation theories Future development is seen of synergy (2 + 2 = 5 and)similar) caused a tremendous omount of over-centralisation.

Today the penduium has swung

the other woy and the fashion is,

small is beautiful. Thus many

highly centrailsed computer

departments are now under

pressure to decentralise and

move their computer power out

Arguments for and against

computer decentralisation

abound with all the personal and

political implications of any

radical institutional chonge,

Emotions can run high but the

facts tend to Indicote that total

centralisation and total decen-

tralisation are generally the

certainly evolutionary.

available on the murket.

Distributed computing provi-

des direct computer access to a

vast new public. The VDU is in

fact becoming a standard piece

computer access becomes com-

monplace, the udvent of termi-

nal fucilities in the home grows

found in the Western world -

with its long tradition of

improving office methods, its

growth. The economic cir-

thin of all levels of management

on the lack of adequate infor-

matten systems und the high

facilities are ovoiloble, they are

often found to be unresponsive

and expensive to usc for

interactive opplications Com-

pore then the ready availability

of smoll powerful distributed computing systema that can

with data communications.

office furniture and as

to their end users.

terms of minl/mlcro composit and leaping the technology is a real attraction. The effection human Interface software many minicomputers is the consideration for obtaining attractive cost/benefit at transfernng akills in high tal nology systems to inexperient

Ironically, it is in the environments that the solute technology, transparent to E! ignored by the western use. eventually tapped and exploit by users to satisfy applicativity needs that are often outside the In these Eastern blocabil

most expensive systems. The most cost effective solution is World countries, distribute computing primarily replace basic minual methods, where somewhere in the middle and Fortunately, the maturity of In the west, it is replace mechansied methods. In the existing computer users will l'onner inter-computer comp prevent too many palace revolutions, to the relicf of all concerned. For a realistic mequality land line. The Lour thodology for evaluating distrithread is local processing wi buted computing, an NCC publication "Why Distributed Computing" is the best study systems that are simple tone.

> Throughout the world, P. are discerning in their evithms of products and put. inrly careful in ensuring 5 technical and customer neering services. Users manufacturers to sell and !port their systems dire: ruther than operate this. ngencies. In the west, 10 prefer manufacturers custo engineering but elsewhere 15 will often expect manufacture

use of suphisticated office Worldwide the relevant distributed camputing systematic the solution of data a communications facilities — a fertile environment for rapid information processing lems is firmly established constunces of recent years and the Western warld, the Impa: the advance of the electronic felt on the structure of orge office hove incused the atlensations and the computer. of the Individual within s organiautiona While the in incitolion of such syll cost/low productivity of scarre grows impidly, there has been evidence of a mindless risk Where centrolized computing

If anything, the salt complexity of many scheet highlighting the need los and the salt is a salt in the salt is a salt in the project management and are being cautious in approach to ambitious page In the field of date systems, new technolog provided multifunction of

among the most technolog advanced in the triple that This is the triple that characterise distribute

amali to madium scale rarely

**IBM's System 34** up to 9600 bpa.

IBM's System 34 workstarion-ortented small business system, only five months after its launch There is also a new remote display station, the Most significant improvement is the introduc-

**Enhancements for** 

enabling System 34 to be installed both as a remote terminal system communicating with a lost, and as a host for up to 64 remote terminals installed in clusters af eight. Previously it could only link to an

To achieve this, maximum main memory has

5251 Model 12, which supports up to eight Model 11 displays and 5258 printers in any mix. The bigger memory will be available in November 1978, and the extra communications equipment and remote concentrator in March 1979. Additional programming aids and a Fortran

compller will be available in February 1978. All software is available on a lease-only basis

# DG releases its own language

for s sophisticated high-level area. systems development language, Data General has released its own Isnguage, DG/L.

has been using the language internally for some time, and several ninjor Items of user software have been watten in it. DG/L ltself, however, will not be of value to the majority of

"The DG/L language and its concepts require technically qualified camputer users," and a ighly systems software orientd, compared to the many users This specialist market is

emphasised by the terms on which the language la offered No detailed customer aupport will be provided with the package, apart from 40 hours of system engineering aervices.

The language is based on Algol, having the block-structured format which has become increasingly popular as an aid to structured programming, l includas auch advanced features as the ablilty to accommodate user-defined data structures and operations. At the same time. whose software needs fall into is provided with "low level"

manipulation of storage addresaes, and direct operating system

The DG/L compller runs on the Data General Eclipae, under RDOS and AOS operating systems, but can generate code for execution on any Eclipse, Nova, or even MicroNova, configura-

The compiler is priced at \$5,000. Duplicate copies may be

**Datasolve's** 

**COMPUTATIONS** of volumetric from transducers inetalisd in the mass and onergy flow for process control opplications can now be carried out by using the 7900, o figurations of live transducer or selected, on-sho, to provide the dosired output, ond transducer chorectoristics may be disployed instantly for verification or variety of inputs, representing such values of density, stolic and

amendment. This romovos the need for normal setting-up pro-cedures in the squipment. differential pressuro, temperet-ure, specific gravity, fluid flow Burroughs' latest machines now in UK

succeed the B700 switching THE two Burroughs B600 switching and communications systems, and are code-compatible with the commarcial BE00s. computers announced in the US (CW, January 6) are now the B80 and the B1800. The B876 available in the UK. and the 666-2 both have 500 The new machines, designat-

nanosecond processors and the ed B676 and B666-1 and 2, 866-1 cycles at one microsecond.

Datasolve says the income from business on the 2970 has been doubte that forecast, with half the business coming from organ isations using the 2970 as a awn machines to be instailed Terminal systems attached to the 2970 include a 2903 run by a customer in Holland. BOC accounts for less than 10% of the work on the 2970.

Viewdata directory

FIRST directory to be made available on the Post Office's experimental Viewdata service is the Hollis Press and Public Relations Annual, which lists press information sources Viewdata marries the television set, via the telephone, to a

#### In aid of disabled end blind computer staff **COMPUTER WEEKLY'S**

# Annual

### The industry's big night out

Computer Wookly is holding its second Charry Sall. Lest year we celebrated out tenth anniversely, this year we see just celebrating Come and join in the big night out for the computer society Specialist Group to the found to the Dritish Computer Society Specialist Group to the development of a keyboard terminal designed for use by disabled and billind people. The Boil is being held under the patronage of the BCS and we hope that our readers will buy lickets to support this year wat thinking cause. Come and join in the industry's big night out.

Dinner, cabaret and dence until 2 s.m.

### Friday, October 14 at the Royal Lancaster

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n-ations further centralisation and install a least a light a light and install a least a light and install and install a least a light a light a light a light and install an

#### Tribunal rejects ASTMS claim on NCR redundancies edequate compensation it is not, in the view of my members, o

Scientific, Tachnicol and Mana-gerial Staff that it should have cles at NCR between Dacember. 1976, and March, 1977, has bean rejected by the Ospartment of Employment's Industrial Tribu-

About 26 people in the ASTMS from the property in the control of the faur-menth period, including programmers, computer supervisors, and other sesociated staff. "The decision is diseppointing, but not totally unexpacted, and easies the compeny to continue to make people radundent without having to consult the union," said Jim Mercer, divisionatefficer for ASTMS.
"While NOR."

"While NCR has every legal right to carry out thase redunden-

good reflection on the company.
However, en NCR spokesmo and are pert of the company's bid to dayslop and retrain its marketterminsio more affectivaly

that despite the rejection of ASTMS claim, "It will not deter us from gaining bargeining rights with the company."

A meating of ASTMS representatives in NCR hos baan called

for October 15, when It is pionnad to diocuse the altustion, in addition to a meating being held today (September 22) to recruit NCR computer personnel into the

# **Vatacomms workshops**

A SERIES of workshops on data processing group.

provide the local manager with. one'a adventage. Suffice to enquiry and up-daily say computer manufacturers do media operation with OCK not sell distributed computing.
Users buy it.

OMR together with mining of the communication all from the communication. In the Eastern bloc and Third World countries distributed computing is also becoming the norm, albeit for stightly different reasons. These countries have not experienced the rapid comuterisation of the last 20 years the world with the most technologies. in the west. The mainfrome computers that are installed are

communication and distributed processing la planned by IAG, the IFIP applied information of blema of man/machine interfac-Issues to be covered include ing, the stability or otherwise of

Attendance at each is limited currently available network ta 25, and the first, to take place technology, Input/output devia) the Marriott Hotel, Amater-dam on November 17 and 18 will guards against failure, and be chaired by Robert Reid of Logica Benelux. Each participant will be expacted to provide a show the state of the control of t

a short paper on his interest in the subject which will then be Pottarstraat, 1071 DB Amaterdistributed and discussed at the dam, Netharlands, telephone Amsterdam 76 35 26.

# BR, Giro OCR orders

From front pege

on to the Recognition Equip-ment TRACE systems where alphonumeric information will be read and encoded in bar code form by an ink jet printer ready for multi-pass high apeed sort-

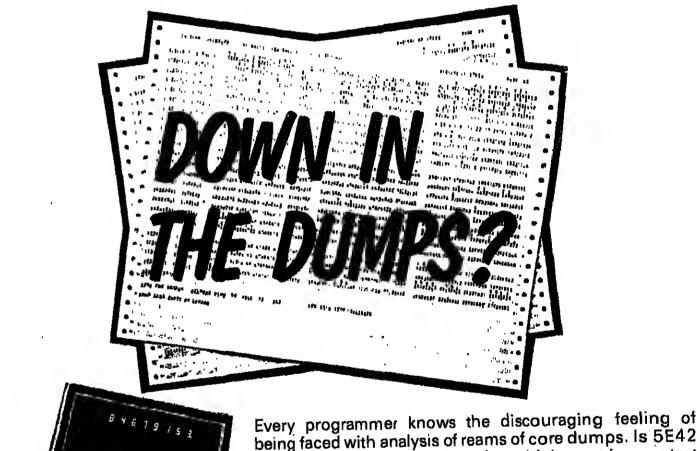
Data captured by the Lundy Farrington system will be recorded on magnetic tape for processing on the ICL System 4 mainframes at the Giro centre.

The Lundy Farrington 1007e That Limited, the computer

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Lundy Farrington hopes to win contracts for the aystem from Giroa in other European countries. At the moment many of these use Recogition Equip-ment systems similar to those now at the Giro.

are configured around multi output to microfilm and micromicroprocessors, including intel fiche buraau aervice of the highest minater Bank, in be linked in groups of 10
Controllers, each based on a
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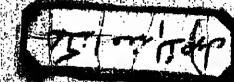
being faced with analysis of reams of core dumps. Is 5E42 really equal to the decimal number which went in your test data? By how much is 42326764 offset from your program's base address?



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COMPUTER WEEKLY OFFER



# How to get your money's worth from software packages

# By Zoran Pirjevec

REACHING a final decision point on buying aoftware is not easy, as people who have been on the Magical Technical Tour well know. Somatimea even the final results aren't enjoyable

It is agonising to spend great amounts of time and end up with a software package that doesn't do exactly the job you want. It is many timea more agonising to try to write a ayatem that is perfect, however, and that is why the software was purchased to begin with...and why the shortcomings are lived with,

In recent years, we have seen a common methodology develop for the evaluation and acquisition of proprietary software. That method states that you will (1) identify your need, (2) scour the directories for possible solutions (3) write to vendors for literature on products, (4) schedule presentations with those with the most promising literature, (5) evoluate the products in the final running, and (6) make a final purchase

This whole process is a narrowing-down exercise with the ultimate purpose of finding the best package to meet a need. The trick of making the search as fruitful as possible is to make the aearch as ahort (inexpensive) as possible, but without sacrificing confidence that the

end product is the best available. As a software vendor who has been around sinca the Great Unbundling of 1969, with some 4.000 customer companies around the world, we have been

Products and manufacturers

Trede associations

only through

American firms in Eur

and information gat hering techniques that people can use to shorten that software acquisition cycle with greater confi-dence that their final choice is the right one. One atill has to identify the need and survey the catalogue for the choicea available. The intention of what follows is to ahorten that

ing-down process. Tha first ahort cut comes into play shortly after one has identified the need for a specific aoftware solution. It is called "knockout factora," a list kept in mind all the way through the

There are the obvious ones of upper cost limit, modifications necessary to make the package run on your machine, amount of core required, payment plans avallable (if you can't afford large sums of money at once, lease is essential for acquisition). coat of on-site evaluation, hardware/language restrictions, etc. Two additional areas of knockout factora should be explored early in the acquisition cycle. The first is the company behind the product. The second

is product applicability. When you are looking for a ihome, you are well advised always to look at the basement first before being excited by the wellpaper or the size of the master bedroom. The foundawhat holds the whole thing up. Software purchasing is no different. The company behind the product is the system's foundation. And it ahould be explored thoroughly.

able to identify some short cuta You are ostensibly purchasing software for a long-term benefit. You are paying a good deal of money for the software to keep up with hardware technology and computing advancementa.

> You want to make sure that is the intention of the company behind the products. If a company is profitable and auccessful, that is a degree of proof of market acceptance and stability. These are questions you should ask: What is the salea and profita-

blity history of the company? What is its financial strength? How old is it? What user organisations exist for your products? How widespread is your serviceability? Local? National? World-wide? How many products does your company sell? How many are on the Datapro Honour Roll of Software? Is the company a member of the Computing Services Association?

Assuming that the company behind the product looks sound estough to grow with your data processing needs, it's time to ask some pointed questions about the product itself. Try these:

I. What is the product's enhancement record? This will tell you just how well the product is keeping up with technology.

2. Is there a maintenance fee for this product, and if so, what do I get for maintenance?

3. What kind of technicol support is there? Telcphone only? Is there a periodic problem

4. How good is documenta-

Tha second adlition of this valuable three-language (English, French and German) directory gives datails of 2,800 firms, including 130 from Esstam Europe. 880 products are grouped

inio 28 chapters, covering cables, componenta, computers, malerials, production equipmant and 21 liaida of specialised

cross-relarencing from products to manufacturers and —lor the lirst tima—irom firms to products. Special attantion has been paid to the indaxing which is separate for each of the

three language sections. European Electronics Suppliera
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tion, and how often is it revised? Documentation la never perfect, but vendors who strive to approach perfection have your

best interests at heart. 5. What kind of training do I get with this product? In general, the more comprehenaive a system ia, the more training is required. One should expect on-site or peraonal training of key personnel upon installation with possible follow-up training included as part of the purchase contract. The better the training, the more use the product will get and, thus, the more benefit it will be to your

6. How many instollations are there of this product? You will find that the more installations there are, the more bug-free the system will generally be. 7. What modifications are

necessary for installation? If there are any, they will cost you money. Find out how much. 8. Is there any chorge for evaluntion? This should have

been stated ot the beginning but t never hurts to ask. Now that you have tested both the company behind the product and the product Itself (all of which con be done on the telephone), you are ready to take some other short cuts that will get you to that successful

Chances are very good that, after you have qualified the vendor down to this point, he con give you excellent ideas on how to use the product.

Aak for user references in your industry and with your specific machine type and operating system, and contact especially like to have input of them to find out about their systems that they will be used as a cost-free consultant

acquisition. He la a walking

coat justifying his products,

studies that show the benefits of

his products, experiences of

others both with and without his

product etc. It is also common

and fair to ask each vendor

about his competition ... not to

downgrade another product, to

illustrate the superior or unique

aspects of one prinduct over

Get Information from profes-

sional societies such as the

Association. Also try members

It is likely that if you have

more than five people in prog-

ramining and management in your installation, some of the

it won't toke long to ask your

some direction as to the ques-

considering.

of your hardware user group.

expected to use. Then, when a final decisions made and the time comes to train your people and hall product acceptance, because they were involved in the decision to acquire such software product, that accepance will be considerably high than If they weren't considera

Zoren Pirjevec, of Panto

phic Systems UK, Tell

eight pointed question

to eak before coming to: finel decision on which

aoftware to buy. And le concludes that the key le auccese la the reliebility

of your peers, and the information they have been able to glean through first-hand knowledge of various software systems.

systems.

way to evaluate software, but is less expensive than subsiting your own evaluation h search. The only way for the short cut to be truly effective. to check more than one sound or commission more than &

objective any one source mittry to be, that source is limited: one thing you don't need ale evaluating software. It half-knowledge of a topic. ople are relatively new. And it

is likely that they have had The key to success involve, software experience elsewhere these short cuts is the reliability In the data processing industry. of your peers and the infert: tion they have been able to people if they have familiarity with any of the pockuges you are knnwledge of various softwar systema. For as much l means should their pockaged software provide opinion be the last word on the systems tools without her system evaluation, but their input con certainly give you venting the wheel," using the experiences of others said luplicating shopping effors
Couple that information at tions that should be osked in a

broad sense. There is a side your own and you will stit. benefit of such a polling, and more chance of picking the ne that is that the employees inve

# French install computers to probe UFO mysteries

The mystery of unidentified flying objects could soon be penetrated when a voluntary society in France fulfills its aim The Society for the Study of Spetial Phenomene, based in Toulors on the south coest, elms

to instell computers at a

research centre it is setting up, and on board a mobile observation unit to control reder, meteorological aquipment and

ranging from 13-year-old scitoolboys to doctors and high ranking officers in the armed

GEC for a bigger share of export

stakes in a number of other

in the computer industry.

companies not directly involved

Racal's new policy of building

ment trust — a company whose

main business is investing in the

Racal has also declared small

markets.

only hord facts and that the research centre and computers with help it along this path of objectivity. It also alelms that they will put it also of similar organisations in other European countries.

information on UFOs is shown by the fact that the US oir force has investigated 12,000 sightings over the last 20 years.

About 11,300 heve been identified as things like weather ballons and reflections

# Racal stake in Plessey stirs industry speculation

possible restructuring of the UK electronics industry has been that Racal Electronics now has o

tiny holding, 0.4%, in Plessey. Decca also features strongly in talk of a restructuring, but the company's chalrman, Sir Edward Lewis, is understood to be agoinst the proposals for a rationalising of the UK elec-

NEWS IN BRIEF

Zygal to design

Sigma console

A CONTRACT to design and manufacture a control console

for the Xerox Sigma range of computers has been awarded to

The contract, placed by Telefile Computer Products Inc. is

for ten consoles, and shipment is

due within the next few months

Each will be based on a Diablo

HyTerm, and will be used as a

THE Federal Highway Adminis-tration of the US Department of Transportation has awarded a

\$717,000 contract to Honeywell

to study and improve software for digital computer-controlled

traffic signal systems. Hon-

eywell's treffic management

centre in Minneapolis will con

MAKING a contribution to the relatively new science of color

imetry is a Digital Equipmen

PDP-11/05, linked to a spectro-

photometer, which is being

marketed by Color Assistance, a

French company. The system also features a VT50 video

terminal, a teletype, an LA38 DECwriter II and a graph tracer.

THE manufacturing and deve-lopment facilities of Univac's

disc drive manufacturing subai-

duct the four-year project.

Zyyal Dynamics.

primary I/O device.

companies has aroused some critical comment from observers who say that the company is beginning to look like an invest-

appropriate use for the share-

If this view gained strength it would tend to hit the Racal share price because most investment trust shares stand at a discount of about 30% on the value of the underlying secur-

"The City is unhappy because it does not understand what is happening," a Racal spokesman

department believes that at the moment it is better to invest In well-managed British companies than in bank deposits or fixed interest stock now that interest rates are so low.

"The chairman has also said

that Racal is acquisition-mindlanguage is aimed more towards bjects and assembly operations selling shares for years. And as rather than motions of the mechical assembly machines those which want money for expansion can have It."

and Develonment.

"The level of language has standby.

The control of the co

. 1885 - 1892 - Sungaran -1889 -

El transporter de la companya de la

The second secon

has taken place on Autopass up

to now is presented in a paper by Lawrence Lieberman and Mi-

chael Wesley of the IBM Tho-

mas J. Watson Research Centra,

New York, in the latest edition

of the IBM Journal of Research

# Robot language developed by IBM

AN experimental programming been chosen to provide a high language that allows the user to degree of assistance to the user program industrial robots with without systems having to per-English-like statements has form articifial intelligence type been developed by 18M. probicm-solving operations." Called Autopass (AUTOmat-

ed Parts Assembly System) It Operating as a subset of PL/I features such familiar assembly Autopass is said to offer many of terms as LIFT, PLACE, INSERT the control and data type faciand TURN, and uses a database called the "world model" to

#### internally represent the machine's "real" surrounding **Access times**

ACCESS times for the Mostek 4K and 16K dynamic RAMs have been trimmed back to 120 nanoseconds, with a projection that by the end of the year access nd Development. times will have been further The outhors say that the reduced to 100 nanoseconds.

The memory cycle time nov atands at 320 nanoseconde and power consumption is 482 and 20 milliwatts when or

しょう こうことはかずまの間はみ (連続機能)

# MPG

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EQUIVALENT ...



management information systems pty. Ltd. 150 REGENT STREET LONDON W1 Telephone 01 734 9571 Telex 261426

# diary, Information Storage Systems, are to be consolidated in a new \$15 million centre at Santa Clara, California. Most of them are already located in that area, about 50 miles aouth of San Francisco. They produce disc drives partly for Univac, OEM customers, and the IBM plug customers, and the IBM plug compatible market.

A HIGH density bulk add-or memory for minicomputers has been introduced by National Semiconductor. Called the NS3-2, It uses 16 pln 18K bit dynamic RAMs and la supplied in the form of PC boards each with a capacity of 128K by 22 bits. The access time is 280

nanoseconds and the read/write cycle time is 450 nanoseconds.

HIGHLIGHTS of the financial

results announced by Digital Equipment for its fiscal year

cnded July 2 Include worldwide sales of \$1,058 million, 44% up

on the year before, and a 35% increase in European turnover to \$258 million. DEC'a net profits

worldwide in fiscal 1977 were \$108 million compared with \$73

million in 1978.

The book also includes an extending place by of VDU terminology.

215 a 155cm / vib e 212 paged illustrations / sixtany / index.

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# and their application

Edited by Derrick J. Grover Chairman, Brutsh Computer Society Otspleys Group

in industry in ever-increasing numbers. Then applies lone ere wide-ranging, including sirlina-east reservations, stockstock-market and interested retrieval, tent editing and interestion updating. VIBUAL OISPLAY UNITS IN board on a tuiorial seminar organized by the Aritish Computer Society. The book is intended for computer users who stready employ or computer users who already employ VOUs or plan to use them to enture their system. It will be of equal value to management in their basic decision-making, and to the systems analysis and data-prosessing managed who put those decisions into practical affects.

conjents
Raview and trands Derick Const.
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Human tectors in the pet of VDUs
Tom Stewart. Lengtheman, Camera.



# Visual Display Units

Visual display units provide one of the contents lesient means of interaction with a computer, and they are being employed Helitish Co.

#### DATAFAIR 77 John Kavanagh previews the BCS biennial conference

# Theme goes wider than 'the end user'

for although the papers are all relevant to that theme most of them are of much wider significance, not only to end users but also to data processing departmenta and even to the way companies are organised.

One speaker who points to the changes that computers are bringing to organisations is David Sutler, chairman of conaultancy Sutler, Cox and Partnera. He lists four areas of rapid development which are highlighted by the convergence of computing and communica-

. First, he says, public and private networks are becoming a major preoccupation; aecondly, distributed processing allows

puterised telephone exchanges are becoming popular; and fin-ally, different types of traffic — voice, data, texts — csn be integrated into a single network.

aut, says autler, problems are accompaning these developments. What sort of integration is desirable? How will data processing managers face up to valuating new methods? Will total chaos result from too much

Logics, wonders whether cheap hardware will give back to the end user the control he had over filing and Information processing before the computer came

Advances in system design and in technology and moves from data systems to information systems will see a shift from a systema-centred philosophy to a management-centred one, he

between computing structures and management structures, the difficulty of interrogating files and the problems of modifying systems will worry managera iesa. The current constraints upon the design of information systems will be relaxed, and more flexible information gen-

The changes should benefit ated as a bridge between the end the manager, says Patrick Losty. user and the computer will find



Institute of Computer Science, who will bring visitors up-to-date with Japan's "Information society", and Drude Berntsen, director of tha Norwegish Computing Cantre, who will telk on "distributed bureaucresy", besing har apsach on her work on the Norwegish

his role in many respects less stressfui.

that the failing costs of hardware will make software inefficiencles unimportant. "The manegar should assume the role of meking sure systems are used effectively. The argument will swing away from economic use of expensive hardware to effective use of cheap computing."

Mike Cooley, a past president of TASS, the white collar arm of

tation, specialisation, allenation, knowledge obsolescence and what he calls the proletarianisation of white collar ataff, arguing that the bellef that automation frees humans from routine. back-breaking and soul-destroying tasks, is completely John Powell, data processing manager at Prudentlal Assurance, considers that the end user

looks at the effect of computing

on staff. He discussea the impact

on the creativity, job fragmen-

expects help both from the computer industry and from government. He says the user wants help from the industry in using technology to meet com-

Powell says that from govern-ment, the user needs help in getting a reesonable return for his investment, plus freedom of

# Changing roles

THE British Computer Seden biennial conference. Dalaisi starts at noon on October 10 the topic of the user in a social environment, Papers will conthe changing role of manage ment and labour, distributed bureaucracy and the Japanes

"information society".
On October 5 the topics will how new technology will alled the user, and the convergented communications and compu-

Speakers on October 6 wil look at the relationship between the computer industry and the government,

Running slongside the o ference will be an exhibition b hardware and software con panies and presentations by it BCS specialist groups.

Datafair will be held at loc

don's Cunard International H tel. Tickets cost £97.20 to 803 members, £27 to studen members and £113.40 to 602 members. Prices include lund tea and coffee breaks, and VAI The SCS dinner on October when the speaker will be s Monty Finniston, costs £14

Details from Oyez iBC to

at 550 lines a minute.
Printer terminals ranging o

speed from 10 to 120 characters

second will be shown by like printer Equipment.

IBM will feature its 32.2 interactive terminal and the

3790 electronic telephone

exchange. Communications

equipment will also be shownts

General Audo and Data Communications, which will feature

its line monitor switch and paid

equipment for V24 modes

Informal lectures on topic ranging from the organisalized the Post Office to moders dis-

lopments. Tickets for these in

turaa must be reserved it advance: telephone 01-42 162

business language;

The National Compelly Centre will take about the

software - including Field

its training cou

Software houses and con-

The Post Office will git

# The show that PRESENTATIONS by herdware Labs, will show its SEIO

and software companies will truly complement the Datafalr conference with its "end user" theme, while a "technology corridor" will give visitors a chance to see technologies of the not-too-distent future, such es voice data entry, bubble memories and speech synthesis.

Six companies will be featured in the tachnology corridor. Quast Automation will show its Datapad, which occepts hand printed data; Plessoy will show users whot bubble memorles are oli about; and Farranti will exploin the design end monufacture of lorge scela integration

Systems invoiving apcech will be featured by three companies. EMI Thrashold will demonstrate air troffic control, cash and tancies giving presentations include BIS Applied System CAP with its Micro-Colcarry checkout and percel sort-Ing applications on Ita voica data terminal, while Elactronic entry terminal, while Electronic Music Studios will present a computer controlled speech synthesiser called Vocodar for the first time in tha UK.

And Mika will be out to steal tha ilmeilght from Adam on Logical Machine Corporation's stand. Mike is a voice recognition system, while Adam is the computer which is claimed to be the first computer to ellow users to create their own systems in their nativa languaga.

Another EMI company, SE

Sollware indicates and its books.

And visitora who are disciplined with the British Company indicates and its books.

And visitora who are disciplined with the British Company in the Institute of Data Proposition. now wall-established businesa

Specialist presentations

SPECIALIST groups in the British Computer Society will be giving presentations on after the other throughout Detafair.

The timetable for the presentationals:

October 4: 2-3.30, microform group; 4-5.30, disabled group:

October 4: 2-3.30, microform which supports special what can be used by the supports of that can be used by the supports. group; 4-5.30, disebled group; 6-7.15, business information sys-

# Three more reasons why ITT Business Systems means business.

These are the three latest additions to an already extensive range of data communications products from ITT Business

Individually, they offer you a newand extended capability based on the latest computer technology. Each of them can help to make your life easier and your business more efficient.

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The ITT 3630 is a quiet, easy-to-use ystem designed to look good

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The ITT 3805 is a comprehensive and powerful programmable communications front-end processor for attachment to IBM mainframe computers. It provides flaxible network control and enhanced natworking without the nead to change tried and tasted applications or mainframe software.

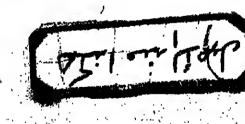
The 3805 will also allow greater choice of communications techniques in the future and can show significant savings in network costs.

#### ITT 3230 Visual **Display System**

The ITT 3230 Visual Display System has been specifically designed to meet all the data communications needs of the Systems Designar, the DP Manager and, of course, the operator. It is very varsatile, good looking and above all, cost -effective. No equivalent system offers so many features at a comparable price. The ITT 3230 with its diskette attachment is particularly suited to file

enquiry and update although many will see it in a data



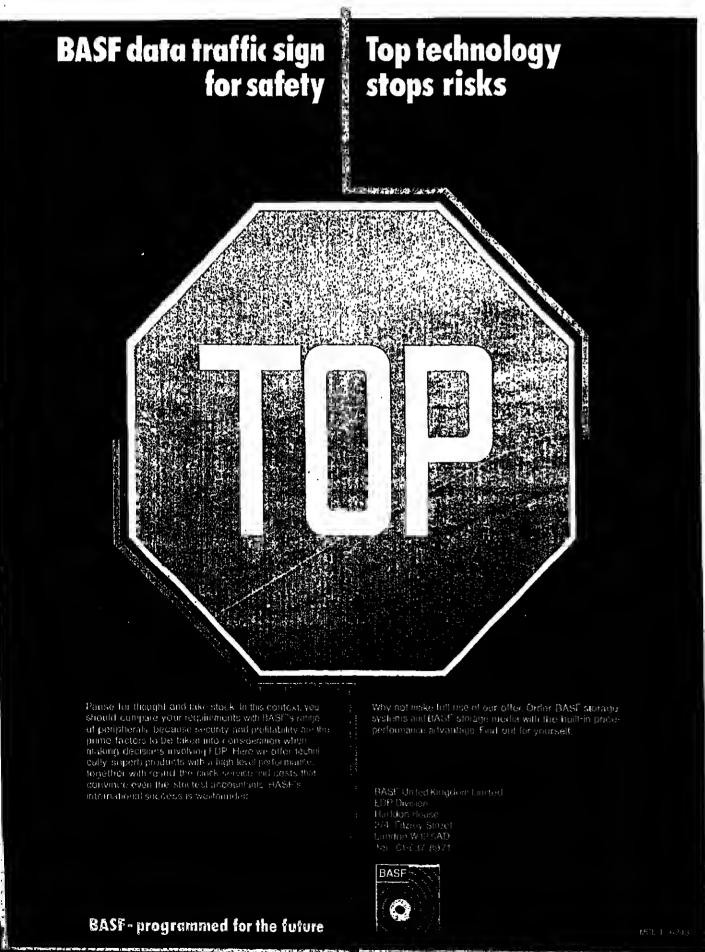


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III : hamessverime | | | | | |





that can be used by

tems group.

October 5: \$,30-10.45, computer operations group; 11-12.30,
auditing by computer group;
2.15-3.45, first time user group;
4.15-5.45, Fortran group; 6-7.15,
computer should into the computer group.

PL/I group.

Leat week Donald Devies, superintendent of the division of Computer Science et the Netionel Physical Laboratory, dis

cussed a recent development which could change

the neture of cryptography. Here he explains the phiciples of public-key cryptography with a alm-

The National Computing Centre is to hold

seminar on dete protec-

tion by cryptography in London on September

# Keith Jones talks to the European boss of US mini maker

# Doubled profits, then growth, is aim of new man at Modcomp

CAUTIOUS determination is the watchword of John Pitt, who has taken on the role of general manager to supervise sti the European operations of US mini maker Modular Computer Sys-

Pitt took on the newly-created post at Modcomp about two months ago after eight yeara with Digital Equipment. When planning and davelopment ma-nager, industrial products group

for the US and Europe. He was based at DEC's US hcadquarters in Massachusette. but the Modcomp job brings Pttt back to his native England, to Woking, Surrey, the focal point of the company's European marketing and aupport team of

Despite serious losses tast year in the US, Modcomp in

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YOU WILL MEET

AFTER a dramatic improvement in its financial performance in the first six months of this year compered with the same period in 1979, Modcomp has signed a new borrowing agreement with its three lending bankers. This will provide it with a \$15 million line of gredit through to March 31, 1979.

Modcomp hit rock bottom in the second querter of 1979 when it recorded a net loss of more then \$4 million on sales of \$7.4 million, making the total net loss for the first heif of 1976 nearly \$4 million on

loss for the first helf of 1976 nearly \$4 million on \$17.3 million sales.

In contrast, second querter figures for 1977 included a net profit of \$612,000 and \$13.8 million sales, while first helf 1877 nst profits were

Europe has been profitable for the last two years - but not profitable enough for John Pitt.

"Europe is now a separate profit and loss centre from the While refusing to reveal the current level of profitability, Pitt operation and my first priorities are to build a workable \$3ys, "t want to double the European organisation and profitability of Modcomp's European operation on the current dual subsidiarias in France, level of business and only then West Germany, Benefux and the

One of the most eignificant facts about the figures a that Modcomp's total costs were only merginelly

Is that Modcomp's total costs were only merginally higher in the first helf of 1977 then in the first helf of 1978 — \$24.7 million compared with \$23.4 million, though sales increased dramatically.

Modcomp stributes this to greater cost consoloueness and higher afficiency, it has also brought in new vice-presidents to apprise accession. operations (manufacturing) and finance, and has set up an executive committee of board members to formulate long-term plans. This is headed by John Lobb, former chairmen of Northern Talacom (CW,

> UK and our agents in Scandinavia, Switzerland and Spatn. "Before my post was created, Modcomp had a sales manager Europe but no general manager to co-ordinate the

whole operation." Modcomp's four main areas of activity worldwide are industrial control and measurement, OEM communications and commerclai DP, in that order of importance and according to Pitt, the jast area will have to remain more or less dormant on this side of the Atlantic until the European organisation is sorted

separate sales team for com- year.'



CHESSLAB

On move 27 the Cyber IX

Minneapolis to which the O 4.6 terminal was connected a

down. Control Data engite

switched to another made

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losing only seven minutes

Chess 4.6 was regularly see

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There was none-the-less

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program, Chess & Sisness

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grams of this general type

sets up export

department

FOLLOWING the great computer exports in the 1

transport International Group

epecial export department been established.

It is linked to the control

import services already oper-

Heathrow airport depot de

A six-man team will deal

documentation, putilisinsurance and other of

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The new department communicate with the latest

traffic clearance compated by HM Customs, and book

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transport.

position into a win.

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peen operation on its current lavel of business, and only than will i

mercial systems in Europe and we will only move into this business when we understand the training and aoftware support implications. We are deliberately hanging back."

The geographic distribution of odcomp's aales in Europe at the moment breaks down nething ltke 40% in Germany and 25% in the UK followed by France and Benelux.

"Germany is the biggest market because that's where Modcomp started in Europe, but I can see France increasing in relative importance," says Pitt.

Europe accounts for about 15% of Modcomp's worldwide turnover, and on the question of whether the company will set up a manufacturing operation over here John Pitt is predictably cautious. "We do not have the resources to look into this at the moment but we hope to review "At the moment we have no the situation over the coming

# **Telenet implements** X25 interface

PACKET-SWITCHED network operator Telenet Corp has communication for computers and terminals using the standard X25 interface is now available on the nationwide Telenet network.

The announcement will come 'as a surprise to many, because tt had been widely assumed that Telenat conformed to the X25 standard from the start.

In fact, Telenet began operations at about the time that the Consultative Committee on International Talephony and Tele-graphy, CCITT, decided to establish an international atandard interface for packatswitching, and although much of X25 was ploneered by Telenet, the need to begin offerling commercial services caused the dard specification. As a result,

Telenet initially will offer X25 support from Boston, Chicago, Dallas, Los Angeles, Snn Fran-

cisco and Waehington. Raytheon Data Systems is the first manufacturar to introduce the X25 Interface for its IBM 3270-compatible Raypac terminats. The X25 version of Raytheon'e PTS-100 eystem wns nnnounced in the spring (CW, April 14). tBM haa also aaid that will provide an X25 line ndaptor for peopla wanting to communicate between Systeme Network Architecture devices ovar a packet-switched

The only full X25 network currently offering public service is Datapac in Canada, Transpac in France and tha EEC's Euronet will both uea the standard, and most European PITa, including company to go ahead without the UK Post Office, are consi-waiting for the complete stan-

# the CCITT standard and the will also use the standard (CWt, warehouse facilities Studies of the disc drive market

TWO studies of the disc drive tible manufacturers about \$254 Stamford Street. London SE19LU. Piense send me . . pre-registration tickets for Compec 77 at the Weinbla Contre, which will entitle the hoiders in free entry if fully filled in with the name and address of the visitor. (Wilhout pre-registration, lickets on ained at the dair

market, one concentrating on million, or 14%. Howayer, the moving head hard disc drives PCMa' share of total shipments and the other on the floppy disc drive industry are now available 1980.

from industry are now available 1980.

from industry consultant Jamea Fixed media hard disc drivas N. Porter, of Mountain View, will show by far the biggast California. Callad Disk/Trand increase in sales between 1976. Raport\* they will be completely and 1980 — from \$307 million to revised each year and each pair \$1,588 million.

can be eupptied for \$600 plus \$50

For each lype of disc drive the for each copy.

According to the hard disc prices, shipments, Installed drive study, 70% of the \$1,876 populations, market shares and populations, market shares and different channels of distribunillion worth of rigid diao drives shipped worldwide in 1976 were tion.

produced intamally by systems. The 80-page Disk/Trend Remanufacturers OEM manu-port on the floppy disc market provides most of the basic tech militial world, and but compa likel details of modes available.

0 0 1 8 27 9 15 51 13 17 14 10 11 11 23 52 49 20 26 18 2 39 25 21 22 33 12 19 5 31 48 7 24 50 36 43 22 34 30 18 53 37 29 35 8 3 32 44 44 45 41 28 53 37 29 35 8 3 32 44 45 41 38 42 4 40 48 28 47 54 Table 1: y=x3, modulo 55, encryption

0 1 18 42 49 25 41 28 2 4 10 11 11 23 7 8 5 36 8 17! 24 19 21 22 33 12 29 20 15 3 52 39 35 26 43 44 44 45 51 53 27 14 30 8 13 67 54

# Practical public-key cryptosystem simply explained

# By Donald Davies

IN my first srticle (CW, September 15), I described the public-key cryptosystam and ita importance for cryptography and authantication. The need to transport keys in secret is avoided and authanticated messages cannot be forged by the

The first news of a practical public-key cryptosystem in the August Scientific American concerns one invented at MtT by Rivest, Shamir and Adleman. will try to explain it by maana of an example of managaable size. They start with two very big prime numbers p and q. For their "test piece" they have one number of 84 decimal digits and the other of 85. tt. is not too difficult to find such large primes. When you set up a cryptosystem in order to receive messages you do not reveal the values of p and q, because they are part of your secret key. You reveal instead their product pq, which in the Rivest example has

the amount of computition 123 decimal digits. This is part of performed per move. More: be learned in October s' To illustrate the method, I Kaissa will run on an Amdili propose to use two much smaller in a challenge match and international Master Dr. primes and to reveal to you their Levy. The Increase of proces product, which is 55. Hardly a one-way function, because you know that I started with 5 and power of the Amdahl ora: IBM 370/168 is approximate 11. To factorise the 129-digit two-fold. If defeated Levys number into its primes would take, we are told, 10th years on the fastest computer! The cryptosystem depends essentially on the infeasibility of these calculations. Alltransport

The second part of the public key is a number s, which in the published example was 9007. For the value of s we shall use 3. This quantity must be prime to the numbers p-I and q-1, meaoing that it must have no factors in

common with them. The process of encryption is the process of encryption is very simple. It uses moduto 55 anithmetic, which means that all numbers differing by multiples of 55 are equivalent (that technical expression to congruent modulo 55). So the best plan is to use only the numbers plan is to use only the numbera ...54 (residues) and reduce all bigger numbers to thase by removing multiples of 55.

Adding and multiplying in this way is easy. You do ordinary arithmetic and reduce the result

The message we are enclpherand we divide it in blocks so that range 0 to 54 Inclusiva. This is a hopeleasly amali block for encipherment. Once again our amail axample reveals its trivialtty. No mattar; the real one is

more than 400 bits long. message m ts to raise it to the power s. For exampla, the message 4 encliphers as  $4^3 = 64$  and the residue is just 64-55 = 9. This calculation can be done by anyone, because the modulus (55) is made public and so is the power (3). Table 1 shows how all the values of the message would enclpher. Note that all the cipher values are dtffarent. This was ensured by having s prime to p-l and q-t, It is very fortunate, since we want to invert the function.

Number theorists will not

be surprised to hear that this can be done by raising the cipher message to the power 7. th our example 9' -4782969 -55 × 86063+4, so The residue is 4. To non-number theorists this may seem like

There is no need to usa such blg numbers in the calculation because each step can be followed by reduction to "residue" form. This matters a lot when residues themselves are 129-digit numbers. There are short cuts for calculating the blg powers, such as repeated squaring to get the 2nd, 4th, 16th, 32nd vers, etc from which others are rapidly built up. With tricks like these, the 9007th power with the blg modulus, we are told takes lesa than a second of

computer time. Table 2 shows the saventh power of all the values of the cipher messaga, and this can ba seen to invert the function of Table I. You may also note a number of special cases in both tables in the first, second and last columns and in the multiples of 5. If the cryptanalyst happened to chance on these values, it might reveal to him the secret p and q, but in the blg numbers game the chance is

Why does it work, and how was the number 7 chosan? The tnversion ts possible because the two functions together raise a number to the 21st power. For any value of m, the 21st power equals m. The daciphering power t which gives at this property can only be catculated be someone who knows p and q. What one does is to calculate the

and q-I which, for our example. is 20. Then one finda tha value of s by solving the equation (congruence) at - t in modulo 20

Number theorists find tittle difficulty in solving such "equationa." The conditions we laid down for the value of s ensure that it has a solution. For big numbers there is a lot of choice of s and t. It would not be wisa always to choose s so that t is

small, because the cryptanalyst might exploit your preference. ahould pronounce this ciphe Remember that s is part of the public key, but t is kept secret. unbreakable, even in the limited A practical system requires sense described, until the theory both convenience and security. of computational complexity

On present appearances the new

cryptosystem is not easy to

operation (a few hundred bits

per second). To find out how

secure it is you have to ask an

expert in number theory. The

program, and not very fast

becomes adequate to prove it. With a cipher of auch aimple structure there is perhapa a better chance for a theoretical basis of cryptography and systems of the same kind - It la aald that some are being patented in US.

Even a rather slow algorithm could be very useful for the described tast week. It could also be used to convey a key in order to set up a secret conversion using a more conventional cryptographic acheme such aa the US government's Data

# GOOD ADVICE!

# Observe these 8 rules when you evaluate independent system software.

Whether it's a sort package program, library system or report generator, it's e good idea to observe the following rules to meke sure your investment... end confidence... are well placed.

. Meke sure benchmerks are sufficiently extensive to provide comprehensive reelistic results.

2. Check on whether technical support is readily available end how competent It reelly is.

3. Ask for a reference list end, wherever possible, contact users for their experiences with the peckege relative performence end support

Telaphone (arsa coda)

package, be sure it's with your own files in your own environment. Artificiallycreeted files can be misleading.

4. If you're evelueting a sort

5. Determine how consistently and extensively the peckage is enhanced.

6. Celculate price-performance retios. A lower-priced product may be sufficient for your needs - and e higher-priced product may prove less expensive in the

. Do not be misled by clamourous claims of superiority. Your decision must be Desen on objective end evaluation.

8. Make sure your software house is here to stay. Financial security, good menagement, a broed product line and an ective new product development program assure stebility end thus continued support and enhencement for the packege you buy.

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or Sue Gillam on 01-491 4706.

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Applicants must have a sound commercial and business systems background. It would be en advantage to heve been involved in computing, and have a knowledge of computer herdware, praferebly IBM and/or minis but this is not assontial. Candidates must have the ebility to lieisa with sanior management and cliants. Ref.

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- a background of around 5 years of software demonstrate
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Ref. 77/09/14

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A wall established and expanding manufacturer wishes to appoint a software programmer whose main responsibility will be for the developmant and enhancement of executives and telecommunications software. It is essential to have a sound academic background in a scientific subject, preferably in computar science or alectrical engineering and have spent st least threa years working in a systems programming anvironment. Knowledge of a communication system would be an advantage. Relocation expenses will be paid as necessary.

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For further information on any of the above vacancies please contact the appropriate consultant. If your qualifications do not match the above positions but you are seeking other opportunities please contact us anyway.

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to £6,950

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Your experience le required naw. A very large number of vecencies ere registered where e knowledge of Assembler or communicatione experience ie essential (VRC progremmere would elso be considered). Opportunities exist in S.W., N.W. or W. London, Surrey. Heris, end Menchester in this exciting end rewarding field. There has elso based registered some oversess posts to people with 5 or more years in mile computer. ith 5 or more yeers in mini cor CW 38/7 Michael

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who will possese considerable experience in COBOL with Assembler, preferably on IBM 370 computers, and will the choice of being trained for systems programming or the applications programming group with a career part of systems energies. Selery to A \$13,000.

Suitebly quelitied applicants with a genuine many remigrating to Austrelia should write, giving a user of the many state of the contected during business and and including full details of education, ampleyment history references.

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Mr. J. Healey, Personnel Manager, High Street. Potters Bar, Herts. IDEC, Canada Life House. Potters Bar Herts.



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# Systems Programmer

London-Essex border

circa £5750

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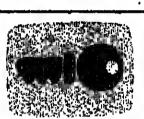
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# **Senior Programmer**

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- both on-line and off-line experience Remission communications equipment, terminals, and complex (3 th would be valueble but is not essential). anthusiosm and the ability to implement pract
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We have been retained by clients to advise as the ser-opening. Please ring us for a confidential initial succession quoting ref. 672, or write briefly.

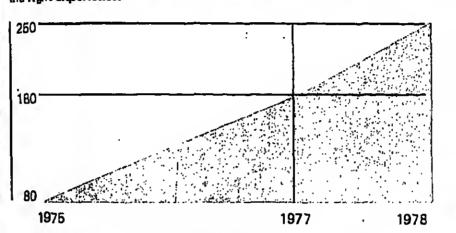


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> TUESDAY 27 SEPTEMBER

> > 12 noon – 9 p.m. WEDNESDAY London Esso Motel. **28 SEPTEMBER** Empire Wey.

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12 noon - 9 p.m. White House Hotel Albany Street, N.W.1.

12 noon - 9 p.m. Littlewoods store

**Hounslow Centre,** 

12 noon - 9 p.m.

Littlewoods store,

5-9 North End.

High Street.

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WEDNESDAY

FRIDAY

TUESDAY

27 SEPTEMBER

29 SEPTEMBER

**28 SEPTEMBER** 

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MON~FRI 26-30 SEPTEMBER

12 noon - 9 p.m. Littlewoods Management Sarvices Training Centre, 2nd Floor, Spinney House, Church Streat.

### Midlands

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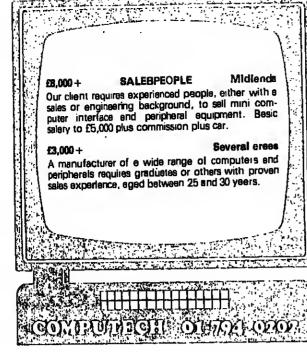
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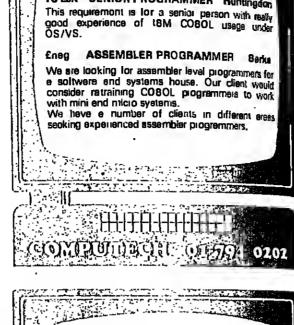
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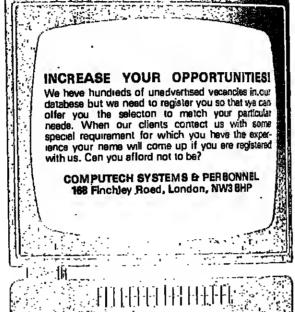


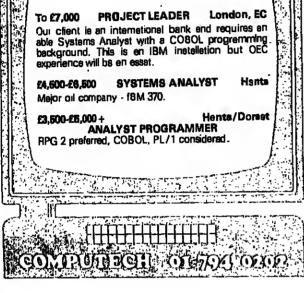


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Raf. 717/CW/Nevilla John

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Ref. 446B/CW/Sharon Matthaws DL1/COBOL Programmers

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Ref. 446C/CW/Sharon Matthewa To apply for any of the ebove positions or for further information, pleasa telaphone or write to the Consultant concerned on 01-242 9356. If it would be more convenient to write to the Consultant concerned on U1-242 9500. If it would be more convenient to telephone in the evening, the telephone numbers are:

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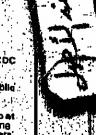
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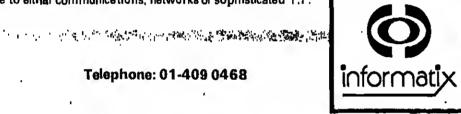
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# COMPUTER ANALYST/ PROGRAMMER

lewcastle upon Tyne Up to £5007 British Gas at the Mathemetics and Computing Department, Engineering Research Station, Killingworth, require a computer analyst/pro-

The duties are to meintein and develop acientific computing facilities for use in processing pipeline aspection data. The work includes systems and pplications programming, herdwere end soft-Wate evaluation, providing advice and assistance to in house users, and setting up an operational Configuration is a PDP 11/45 running RSX-11M.

You should have a degree or equivalent qualification plus computer programming expanded including assembler-level language (preferably MACRO) and FORTRAN experience.

A requirement to work non-standard hours may arke and, when applicable, additional allowances

The salary is within the range £3777-£4695 piùs 312 Flat Rate Supplement. Initial placing according to age, quelifications and experience.

Please write for an application form, quoting reference ERS/803908, to the Senior Personnel Officer (R&D), Brillish Gas, 59 Bryanston Street, London WIA 2AZ Closing date for applications

BRITISH GAS



Project Managers/Senior Consultants Senior Systems Analysts Analyst/Programmers

up to \$A12,000-18,000



Logica is one of the world's leading software, systems and consulting companies with 500 staff and offices in Europe, America and Australasia. Our local Australian office is in Sydney and we have clients drawn from mejor private and Government computer users. Our reputation is that of one of the highest quelity consultencies in Australia.

Our immediate requirement is for Project Managers, Senior Consultents, Senior Systems Analysts and Anelyst Progremmers to work with advanced on-line commercial systems, for mini computers and dedicated small mainfremes. Successful epplicents will be based in Austrelia permenently or, on 2-3 year essignments. Logica will been the cost of air pessage and relocation expenses for successful epplicents and their femilies.

Applicants must have a proven accord of admissionant in their field, and be ambitious, self motivated and flexible in their approach to work : previous experience with both

mini-computers or meinfremes working in an on-line environment with a range of languages. A degree or equivalent is desirable but not essential.

In our fast growing company, career prospects are excellent with opportunities to work on a wide range of projects. Salaries and fringe benefits will be ettractive and if you want to travel, essignments outside Austrelia in the Logica group can be errenged for the right candidate.

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64 Newmon Street London W1A 4SE telephone 01-637 9111

### **Tutor Computer Training** Centre

£5278-£6800 p.a. inc.

Applicants should have

Five yeers experience in computing – et least two working with IBM mechines, ideelly in en Operating System environment.
A good knowledge of IBM Job Control Language, Cobol end/or Fortran. The ability to communicate easily with all levels of etaff (teaching)

experience would be en edventage but is not assential).

The lob will involve

Teaching on courses given by the Centre.
 Prepering course notes and training manuals

Writing end teating progremmes.
Perticipating in the review of existing courses and the development of

The Treining Centre, located at our Headquarters in London, is primarily concerned with running courses for our own steff, but certain courses are open to outside users. Courses have been developed for all levels of staff involved with computer programming, operating and applications. Some appreciation courses are also hald.

Applications stating full relevant details and present salary to the Group Personnel Officer, CENTRAL ELECTRICITY GENERATING BOARD, Sudbury House, 15 Newgete Street, London EC1A 7AU, by October 6, 1977. Quote



The UK Division of CAP/Gemini/Sogeti Product Marketing Company wish to appoint experienced and professional

### PRODUCT SALESMEN £6.500-£12.000

UK. London based

The producte involved are

1 SYSTEM 2000 For this you must heve

\* a minimum of 5 years in OP

\* 360/370 0S implementation, development or support experience

2 MULTIFASTER, SYSIF, SYNCSORT, OPTIMISER 11 PLAN IV

For these products you need

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\* a partence of "M instelletions, preferably OS"

For full details please ring Jenny Dalrymple-Bay on 01-493 2947 or Besconsfield (04946) 4579 For full details plaine ring Jenny Dalrymple-Hay on 01-493, 2947 or Bacconsfield (04946) 4579

For the Job Specification, contact Addrew Reeves, Wanaging Director: 021-236 5234 (2:p-m;-7-p-m.)

DIRECTORATE OF ADMINISTRATION

#### Systems and **Programming Staff** for ICL 2970

All Grades from Grade 3 (£3,230 p.a. min.) to Grade 8 (£6,142 p.a. max.)

nomes in remand for across to nom puter facilities and for computer services hed led to the installation of an ICL 2970 computer with an extensive telecommunications network of RJES and VDUS. With the planned development workload the system will be progressively enhanced to become a 2M BYTE machine with 3000M of on-line storage by the social 1979.

and ol 1979. The expansion of the unit end its sphere of activity magne that vecencine have areen for ell levele of systems and programming stell in the section of the computer with concerned with the development of computer systems in both financial and water management applications area. Applicants, male or female, must have a proven record of data processing in the erees of programming, system design or implementation.

Exparience in a similar sovironment would be an advantage eithough training will be given where

Retection forms and job descriptions (mets area of work preferred) may be obtained from: The Computer Minneger, Anaton House, 137/139, Preston Road, Brighton, Susanx BN1 6AF. (Tet. Brighton (0273) 507-101 Ext. 205). All application forms must be received by 6th Optober 1977.

Southern Water



#### ANALYST/ PROGRAMMER

salary £5000-£6000 + COMPANY CAR

Join a dynamic Midlends compeny marketing DEC and other minicomputers on a turnkey beats.

We seek to recruit e person with considerable experience in dynamicrolal epplications. Pre-Salds work is an importent part of the job — some experience of this or plenty of enthusiasm, will be needed.

We provide a company sata perision. Insurance end





# While ten men wait for something to turn up one man turns something up.

We really baliava that the indapandenca wa giva our Fiald Servica Enginears halps them to meka the most of tha challenge provided by the world laaders in mini-

computers.

Right now, we are looking for FIELD SERVICE

ENGINEERS to work on our highly successful LARGE

DEC SYSTEMS 10 AND 20. We have opportunities
in Dundee, London, Melvern, Farnborough and
Oxford for man and women with HNC/HND in alactrical/ electronic enginearing with a minimum of two years' ralevent axperienca on mainframa installations. Comprehensiva training in herdwara and softwara will aguip you to make the most of your job. Carear advancement opportunities are naturelly first class since we ansure that promotion is given to people with proven ability

Tha salary is excellant, together with tha fringa benafit packega associated with an international organisation lika Digital, including relocation assistance whera eppropriate. If you beliave that you are the typa of person wa era looking for contact: Kan Lanham, Parsonnel Dapartment, Digital Equipment Co. Ltd., Fountain House,
The Butts Cantre, Raading RG1 70N Talephone: Reading 599049 COMPUTING

SERVICE

PROGRAMMER to join a least proming the support on the University of 2970 computer.

Applicants should have a reperience in program at high level talguage to it in scale system. Rowings in apparatus to a subject of the system with his constraint of the season would be a short of the season within the scale (2.244/11) or for an exceptioning energy one anced parson stale 1110 c.6.6.27. (ed. 77/89/06)

COMPILER SUPPORT PROGRAMMER

and meintenence of a Mile compiler for the 2000 was umently being developing Iniversity's 2970 mpt/s

Applicants should have an experience of the beforest lenguage correction and constructed by possible passes and constructed by possible passes and the PASCAL lenguage or ICL 2000 series compute the desirable but not serve

The post will be thisticant for a 3-year period Surgist and surgis

Further particulars of all above posts may be observed from Mr A. J. Small (Molecular Small and Small and

# SENIOR SALESMAN

SMALL BUSINESS SYSTEMS

to £10K

EIRE

As the Irish distributor for Europe's largest manufacturer of small business machines, they are established as market leader. Their products are highly advanced, exceptionally cost effective, and are constantly upgraded to stay ahead. The local support team is excellent, and can call upon fast and effective back-up from

This requirement for a Senior Sales Executive has arisen by a combination of fast market growth and release of more new products. The right person will be developed quickly towards a management position and will lead the sales team forward to even more success.

Candidates should be able to demonstrate a good track record with experience of small business systems, minis, VRC, etc. They must be sales professionals able to understand the business objectives of users and perform at Board Level.

This is an opportunity to develop your sales career in a small dynamic Company but still backed by the product breadth, R & D. and technical support of a major manufacturer.

RW 38/1

# MESSAGE SWITCHING & **COMMUNICATIONS SALES -£10,000+ AND CAR**

This company has established Itself as a major force in the market for message switching systems and other communications products. Backed by an efficient support organisation, the products are unrivalled in capabilities and price/performance. The company has thus secured an enviable share of the market and established an outstanding blue-chip customer base, which is growing rapidly. The company's name and reputation are well known throughout the industry, reflecting its very considerable achievements.

The growth of the business has created new sales opportunities throughout the UK and abroad, to exploit one of the fastest expanding markets in the world. It is a dynamic environment which will appeal to ambitious salesmen who wish to influence management decisions. Career advancement will be as fast as the individual's skills will allow.

Managing named accounts or geographical territories, each sales executive will have a successful track record of practical sales experience in communications-based environments.

Candidates must be professional, self-motivating sales executives, with the experience and ability to negotiate at Board level. Knowledge of message switching applications and/or communications networks is advantageous.

Rewards will be by way of high basic salary and commission to produce incomes in excess of £10,000 p.a. Company cars will be provided and there are excellent fringe benefits.

RW 38/2

### Computer Programmer

Bostrom Division of UOP Limited is the world's loeding nenulacturer of susponsion seating for the truck, trector and Industrial equipment merkets.

We are currantly eeeking an experienced programmer to join our smoll but expanding D.P. Installeton, which utilises an ISM System 3, Model 12.

The successful applicant will have a minimum of three years' programming experience, using RPG II, and will probably have worked in a manufocturing environment. Commencing callery will be dependent upon age and experience, and the company offers o wide range of benefits. Including 28 days' annual holiday and contributory pension scheme with line life essurance benefit.

to: Mrs. P. Cowgill Personnel Officer

#### COMPUTER **MANAGER**

**NORTH LONDON (N.18)** UP TO £4,000 p.a.

The job: to supervise a new mini computer installation consisting of a Nixdorf 8835 processor with console, one split disc unit, line printer and 2 full time operators. The person, ideally an embltious young Operator or Programmer educated to at least 'A' level etondard wishing to wake their first word in a computer management.

The company: a private company with approx. 300 employees manufacturing a wide range of food products. How to apply: Phone or write for application form to Mr R.

J. Ashby, Company Secretary, Rayner Co. Ltd., Commercial Road, Edmonton, N.18. Tel. No. 01-807

#### **PROGRAMMERS**

Preferebly with DEC experience. Contracts for at least months. £150-£180 weekly. No Agencies. 01-368 7348.

UNITED KINGDOM ATOMIC ENERGY AUTHORITY

#### COMPUTER **PROGRAMMER**

A requirement for a Computer Programmer has arison in the Computer Section at Windscale Nuclear Power Development Laboratories, Cumbrie. The Section will shortly be basing its computing cervices on on ICL 2880 supporting both RJE and Interactive terminals and this postwill provide an apportunity for the selected applicant to acquire experience in Systems Analysis and in the writing oil data bank software.

#### Qualifications and experience

Applicants (mele or femele) must posseso e Higher National Certificate or Diploma in a scientilic, engineoring or methematical aubject, or en equivelant quellication. The lengueges used ere COBOL and FORTRAN, femillerity with ICL or IBM operating systems is destrable but not

#### Terms of appointment

Appointment will be to the Scientilic Officer greds with selery within the range £2,300-£3.775 per ennum. In eddition the lollowing

(ii) e supplement of £313.20 per ennum (ii) a supplement of 5% of total aernings (subject to e minimum of £10.88 per month and e meximum of

xcellent service conditions include 20 days onnuel holideye and other enolits empropriote to a otali appointmen

For epplication form please write or telephone — quoting reference \$906/J170, to:

Staff Officer, Windscale Nuclear Power Development Laboratories, Windscale Worke, Sesscale, Sallefiald, Cumbria CA20 1 PG. Tel: Sesscale 333 Ext. 408.

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#### Real-Time-Health Care

The tractor teospital Computer Centra is developed in supporting rout-lime computer services to implicit pixel tenths for a The hierdware includes a community interval in 70 tenthinals in wards, laboratoris and interval in 70 tenthinals in wards, laboratoris and interval in tenthinals and in based on 2 thing ministrative offices, and is based on 2 thing ministrative offices, and is based on 2 thing ministrative offices.

#### Intermediate Operator

£4,133-£5,185 fully inclusive Applicants will have a minimum of 2 years Open

**Basic Operator** £3,496-£4,133 fully inclusive Applicants will have successfully completed a prior trained operator or have provious expenses: a comperable equipment.

For application forms and job description for \$1.54.54. ant. 388. an finations to be returned to #4.54.54. woodeson, Personnel Services.

LONDON HOSPIN Tower Hamlets Health District - part of the and East London AHA (Teaching)

> CONTRACT COROL PROGRAMMERS
> PROGRAMMERS
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CONSULTANCY

CENTRAL LONDON BASED, OVERSEAS TRAVEL **OPPORTUNITIES** 

### INTERNATIONAL UK Salary £8,000 MARKETING + Generous O/S Allowances

This top flight British consultancy seeks a person to develop more business in the Middle East.

After developing marketing plans covering a range of consultancy services, the successful applicant wlll be involved in extensive travel to achieve sales targets. As an experienced person will know, success demands all the traditional sales qualities, plus plenty of patience and resillence. Naturally the rewards reflect the skill required; career prospects within this large consulting group are unlimited.

RW 38/4

c £6,500

Are you looking for an alternative to the traditional telecommunications environment? As a consultant in this expanding department, you will be asked to participate in a wide. variety of assignments for UK and Overseas clients. Using your extensive practical experience, you will continue to enhance our clienties and experience, you will continue to enhance our client's reputation whilst simultaneously broadening your career within and beyond the telecomms field.

RW 38/5

# **EDUCATION**

To £5,000

The "chalk and talk" approach to the teaching of d.p. staff, while not indispensable, is now supplemented by a variety of techniques. Our client is a leading manufacturer of computer systems and they are justifiably proud of the systems they have developed and use for computer-assisted management of learning.

Would you like to make the fruits of your experience available to others? Can you appreciate that special satisfaction that comes from seeing students extending their knowledge and broadening

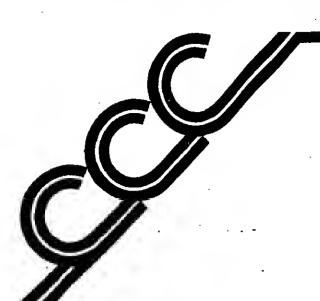
If you have one or two years' programming/systems experience and would like to work in a training environment in LONDON contect us now.

There are also the possibilities of more peripatetic roles, providing local educational support, in the NORTH WEST and on the SOUTH

RW 38/3



NUTCHINSON-SCOOPINS TO BOTH TO DOVE Street London WIX 3PH OD TO LEPHONE 01-490 4501



# **Promotional Opportunities**

The fulfillment of a long term planned expansion programme has resulted in our client wishing to recruit the lollowing additional personnel for its 18 M installation in CENTRAL LONDON Further plans are also at an advanced stage that will augment the present configuration by the introduction of DEC PDP equipment which will be used extensively for taleprocessing.

#### **Chief Programmer** up to £6000

To teke direct charge of a small team of programmars, the person we are seeking should have a minimum of lour years experience of IBM COBOL under DOS or DS. A knowledge of DEC teleprocessing equipment would be an added advantags. The job would particularly appeal to s person looking for the opportunity of a management position while at the same time maintaining a high degree of technical and practicel programming involvement.

#### **Programmer Analysts** c£5000

Reporting to the Chief Programmer, the position requires a person who prefers a programming bias to their job content. However, in view of the heavy commitment to new projects, applicants should be prepared for a certain amount of associated analysis work.

Experience of COBOL, under either DOS or OS. are essential technical requirements. Both positions carry the usual benefits associated

with a member of a large public group of

MAYFAIR CW36/1

# **PDP II RSX IIM**

# up to £6500 London

An international organisation based in London, having one of the most sophisticated real time systems incorporating a worldwide communication network, is seeking additional programmers.

Based on DEC PDP II's and running under RSX II M using RTL 2, our client wishes to recruit programmers and systems programmers at all levels. Candidates currently seeking a move which will combine technical expertise plus career progression and have worked on PDP 11 systems should contact the advising consultant as soon as possible.

MAYFAIR CW36/2

# **Systems** Analysts

# **City of London** up to £6250 +mortgage

A large international banking organisation has engaged our services to assist with the recruitment of Systems Analysts for their installation in the City.

Applicants should ideally have experience of banking systems on an IBM 370. However, candidates with a good proven record of success in other application areas, and who now wish to add banking to their career record, should also apply.

Company benefits include a home loan scheme, free lunches, pension scheme and a total holiday entitlement of over five weeks.

MAYFAIR CW36/8

# **Analyst Programmers** for the **Energy Field**

#### **London Based**

Have you qualifications and energy to reap the benefits offered by our client, a major international oil company, in the growing North Sea energy business. Commencing Salary is up to £5500 with a comprehensive list of valuable company benefits, including free lunches and season ticket assistance

Preferably you will have two tothree years commercially based IBM: COBOL experience and a second language, either Assembler, RPG or PL/I. The job offers you the opportunity to use your communicative skills through contact with users. You will probably be under thirty and a graduate with analytical experience.

To discuss the full specification of this exceptional opportunity, col the advising consultant now:

MAYFAIR CW38/4

# **BOOKS**

# Programming principles and methods

Curreot trends in programming methodology, appears to have been to
produce a book which can
produce a book which can specification and design, edited by Raymond T. Yeh. 320pp. £13.55. Prenice-Hall International. IN the words of the editor, professionnis. In my opinion he has The purpose of this aeries succeeded in the first part of mining methodology is intended to bring his objective and produced together a collection of tutorial popers in each a textbook which will prove useful to students of comvolume ... this first volume puter science for several is to survey recent developyears to come. It is also my opinion that Mr Yeh has, at programming principles and techniques least partially, failed in the for the systemotic design of well-structured and reliable second part of his objective.

of ware architecture." It includes papers on lormal specification of dats reading, but the majority ship between programming and are likely to cause the languages and program average reader to lose structure; a methodology interest, which is a pity. It is for the design, implementa- the average data processing tion and proof of large "professional" who should where systems; software read and absorb the structure and reliability; the levelopment of large this book, so that they may reliable programs; a discus- understand some of the sion on the use of GO TO revolutionary changes tak-statements and structured lng place today in the field sion on the use of GO TO programs; a design metho-dology for foult-tolerent would therefore recomsoftware: control - record mend this book as useful - driven processing; and, finally, guarded commands, are willing to read on to the number terminacy and formed bitter end.

derivation of programs.

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# Six high-level languages benchmarked

FOR as long as there are cient scence there will be a market for books like this which hap to complicate the field which accen-

trate this point.
On the whole, for anyone

For as long as the series and a way without realisting that "high-level" is merely a skilfully marketed euphemism for "ineffi-

comparison of six highlevel languages, the book nieets its objectives. Indeed, of computers. Six languages lt could even be said to justify the claim made in the points of difference are, yet again, accentuated. When, oh wheo, will someone anie a book which accen-

though all programming "language island" has been inguages. Just one or two kept in ita fossilised, dis-Mass on this topic would crete state — all divisions have been preserved. In the and lift any book out of introduction to the chapter taken as representative — introduction to the chapter taken as representative — on PL/I, its origins in Algol, to feel that a computer to feel th special to some readers a Cobol and Fortran are science course in this excith towards a new, simpli-mentioned but little referthe we have book body of the chapter to Illusence, if any, is made in the

hig six programming ien- who wishes to study a who wishes to study a comparison of benchmerks using high-level language is not for devaloping high-level languages on a variety of mechinas, like layman could write his layman has clearly shown has clearly shown feeling that it was based on a write with the layman has clearly shown for the original reason of benchmerks using high-level languages on a variety of mechinas, and the book certelly seems to stall uninterruptible power apply systems is now available of mature, has at least been displaying themes of mature has at least been displaying domitters that conclusions may be derived. If the development, more than the schemes imagined to make the whatever this Proteat whatever this Proteat mature has at least been displaying domitters. If the power of mature has at least been displaying domitters that conclusions may be derived. If the book certelly seems to the subject of mature has at least been displaying domitters that conclusions may be derived. If the book certelly seems to the subject of mature has at least been displaying domitters that conclusions may be derived. If the book certelly seems to the subject of mature has at least been displaying domitters that conclusions may be derived. If the book certelly seems to the subject of mature has at least been displaying domitters. The book continues of mature has at least been displaying domitters that conclusions may be derived. If the book certelly seems to the subject to the subject of mature has at least been displaying domitters. The book continues of the subject to the subject of mature has at least been displaying domitters. The book continues of the subject of mature has at least been displaying domitters that the book does the mature has at least been displaying domitters that but not one comparison of benchmerks

# limits

Information retrieval and the computer, by Or Christopher O. Paice. 200pp. £5.95. No 26 in Macdonold and Jane's Computer Monographs

THIS is one of those monographs which are based on notes for a university lecture course, "put into a presentable form, and offered as a general introduction to the subject. The trouble with this approsch is that a thoroughly Some of the papers are worthy treatment aimed nt very well written and a very specific consumer may be labelled with a title and a publisher's blurb therefore make interesting which lead the general reader to expect something

very different from what he interest, which is a plty. It is It is, for example, rather disturbing to find a volume published under the title, information retrieval and the computer, which inclueconomics of computer-bosed information retrieval; which deals only briefly with online systems and not at all with the user-system interface: which refers to only three operational databases and no operational retrieval systems and which - on page 1 - assumes that it is e requirement for a computer-based information retrleval system that "there is

630pp. £24. Ellis Horwood, distributed by John Wi-EVER since it ceased to be possible to be a Renaissonce Men, a polymath who could no middle-man" ond the "ordinary user" should be eble to enter his own ence shows that even with the recent rapid growth in the use of online retrieval systems some 90% of usage is made via "middle-men" could do was put his money on a likely looking horse (albelt Information specialand hope it led, if not to a ista rather than computer winning post, at least past a specialists). furlong marker or two.

What the book does With the rapid develop-ment of the computer, two posaibilities emerged: first, the horses could run even faster; aecond (and more provide is a general introduction, for computer scientists, to the terminolorianship and information aclence, and to some of the basic computer methoda which are applicable in this eventa. From the letter arose the notion that it was again feasible to map, evaluate and to direct the reported. Thet is indeed, the reported. The resolution of the control of the contro field. The author also sur-

name and a disputed

the name of the game. depressing to find such a restricted view being offer-ed under so broad a title, ing application eree can be so remote from what is

DAVID MARTIN

happening outside.

# Lucid Data processing within well explained

son T. Price, 500pp, £12.50 Dryden Press.

rook in that it genuinely introduces the reader to all eginner to understand data processing, from a feasibility study through systems analysis and design, to programming, operating systems, information codes, data processing machines and even a Illustrated outline of the history of computing

A practical approach is adopted: principles, techniques and details of equipment emerge inrgely in response to the needs of various case studies, and useful examples and exerclses are a feature of the considered from the begin-

Programming is intro-

THIS is an accurately titled ple simulated machine language and the elements of Basic, Fortran and Cohol. those areas of work or study and each concept is very necessary to enable a cardully explained. However, many readers would he dismayed by the unnecessary use of GOTO statements and exit from lonps

Introduced and used. book, Human aspects are chapter,

Magnetic tane and disc particular computer sysning, and on the technical systems are very well treat-side the render is taken as ed with excellent diagroms

edition also mentions such duced through a very sim- things as floppy discs and microprocessors but it has not brought itself up to date on motters relating to program structure, perhaps because this would have

by means of a run-time sary of terms. error (p.257) or some kind of There is a wealth of detail user interrupt (p.273 and and teaching moterial in the 275). It is admitted that the book, and it is well written chapter is far from a full and beautifully presented discussion of Basic, but well up to the stondard we even so, FOR statements have come to expect from could easily have been US textbooks. It should be svailable in school and col-Ideally the simplified lege ilbranes, and it would machine language might be particularly useful to demonstrated many teachers in schools counters and conditional and colleges as a complebranching as o lead into mentary book to the iltera-FOR statements in the next chapter. ture relevant to the pro-

# Software metrics: key to a fortune

tice-Hall International. THIS book is dangerous --it could trigger off a

revolution in computer buying policies.

Worth resding for the foreword by Welnberg,

required too fundamental a revision of material first published in 1972. There is superb value for money. an index and a useful glos-Used in the right way could also be the key to fortune, it will probably be either completely ignored or severely criticised by the snalysed turna out to be one

However, the effect on those who can still think for themselves will be staggerdegreea in computer science, with or without years of experience, people who have retained some intelligence, self-respect and integrity despite the vagaries of the computer business will read and dis-

The name of the game Machine intelligence 8, which we now perceive to nature of the game. But have been nur proper business all along." here you will find reports from the various fronts, set The book comprises a in their true context, by

renge of studies on "the professions is speeking to In cese the penny hasn't unitary theme of know-professione end advanced dropped, software metrics is ledge-representation in its beering on machine intelli-which include computer critical properties of comgence." It reviews theoreti- and information acience, puter epplications, prog-

encompass the whole of what Edinburgh used to call and experimental what Edinburgh used to call insights in applications aritificial intelligence, psy- rams and deta.

Natural Philosophy end the Humanities, those engaged in the pursuit of knowledge have been galloping off madly in all directions. All the determined individual to the determined individual gramming, man-machine describing methods are individued and the pursuit of knowledge and information actione, puter epplications, prog- artificial intelligence, psy- rams and deta.

As Gilb puts it: "Metrics is the language we can use for precise matching of availation actions, prog- artificial intelligence, psy- rams and deta.

As Gilb puts it: "Metrics is the language we can use for older in the language we can use for older At least the riders can now talk to each other (and predict what we can expect

where the daunting jargon to get, and to measure whet permits, to the bewildered spectators). After 10 years advance and consolidatlon, they are talking horse-sense. The combined with an IBM operating sys-

bibliographies, not the least, ten feature of this thoroughly Software Metrics will planned volume, will, in the prove the validity of such Important), the atewards Study Institute held at San-could begin to keep track of ta Cruz, at the University of reader's hand the keys to our computer-using society.

# applications". Tucker's work is by no the tree is almost no mention it all of the underlying though all programming imagings. This all of the underlying flowers all programming in the underlying in a pull cations and sutomatic classification and sutomatic value in the underly labeled in the pursuit of know ledge was heading most successfully to understand to whore the pursuit of know ledge was heading most successfully to understand to whore the pursuit of know ledge was heading most successfully to understand to whore the pursuit of know ledge was heading most successfully to understand to whore the pursuit of know ledge was heading most successfully to understand to whore the pursuit of know ledge was heading most successfully to understand to whore the pursuit of know ledge was heading most successfully to unders

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ligence series began about and fiction is not obvious.

10 years ago, the discipline any more, even to those that that had a the editors put it in the introduction to this volume, "a bad gy, computer technology in the production of the production

name and a disputed particular, has made the nature". Imprivable less so mirror today blatt acle out that a laude claim, "Now all this has longer," This book seeks to been clarified. Not a single outline the role of computational professionel can be term in the development.

When the Machine Intel- THE division between fact just sutomation, will, or could, affect society as a

> Many statements of the past are now within the grasp of present day society, or in the words of the author, "Longuterisation and the title new spart from the specific technological means for implementing the schemes imagined by earlier Utoplen writers."

— The book is in eight main sections: a brief discussion of a particular topic, le. The science-fiction works by writers such as Robert Heinlein, Isaec Asimiov Rober Hiecking Urum Aldiss Christopher Hod der-Williams Samuel R

Delany, and John Brunner.
This study anthology hits many social issues right on the heed and has a good annotated bibliography ROBIN WEBSTER

#### Puzzio answar



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